CANADIAN MACHINERY AND MANUFACTURING NEWS

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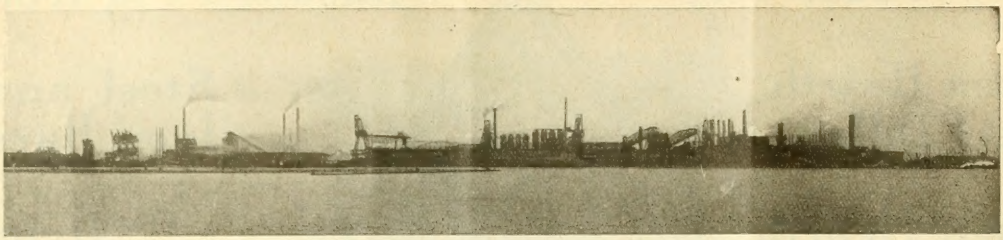

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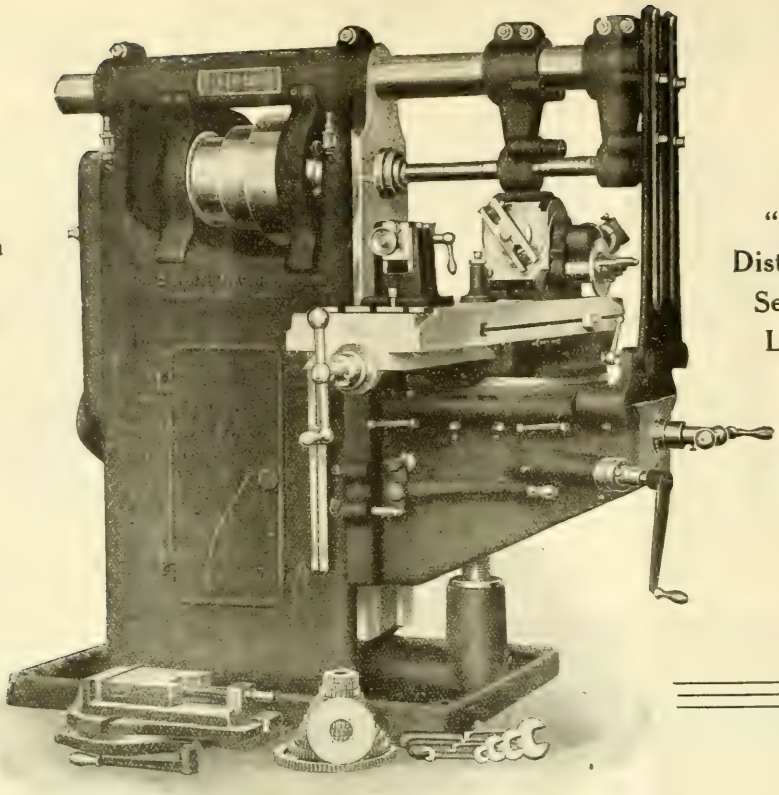

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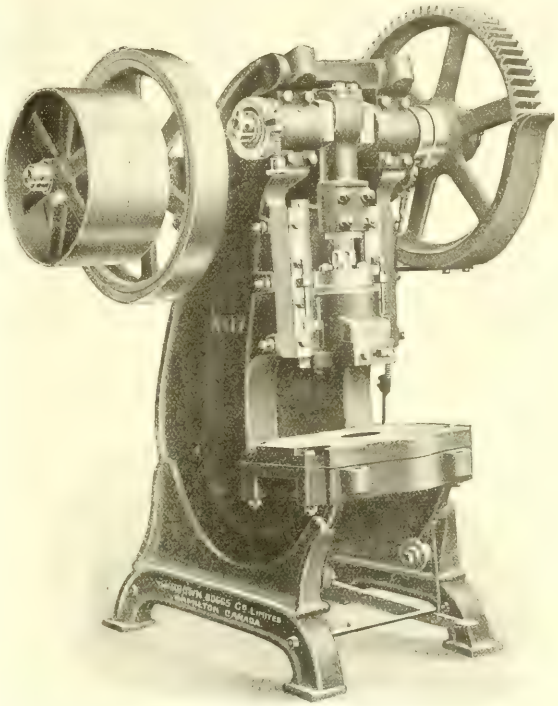

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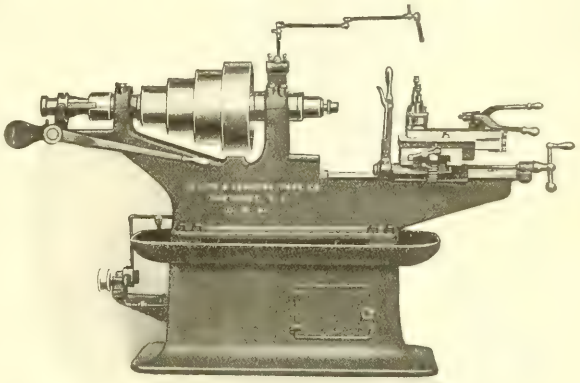

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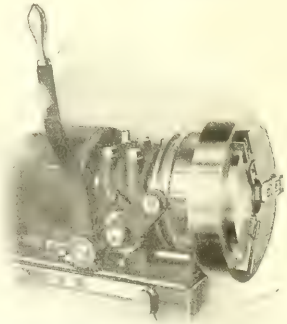

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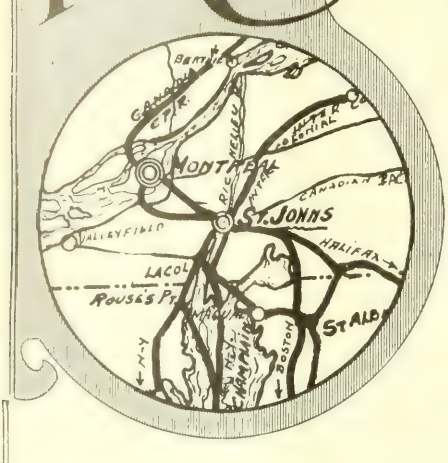

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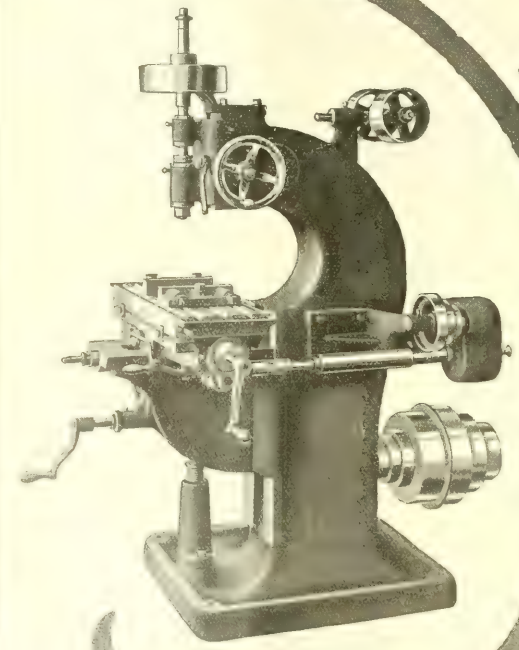

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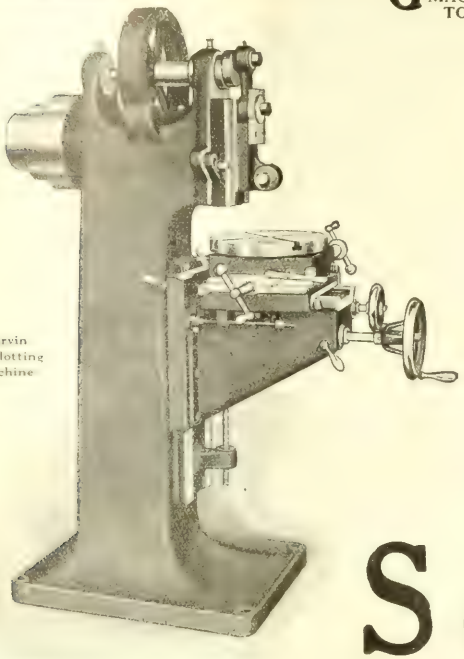

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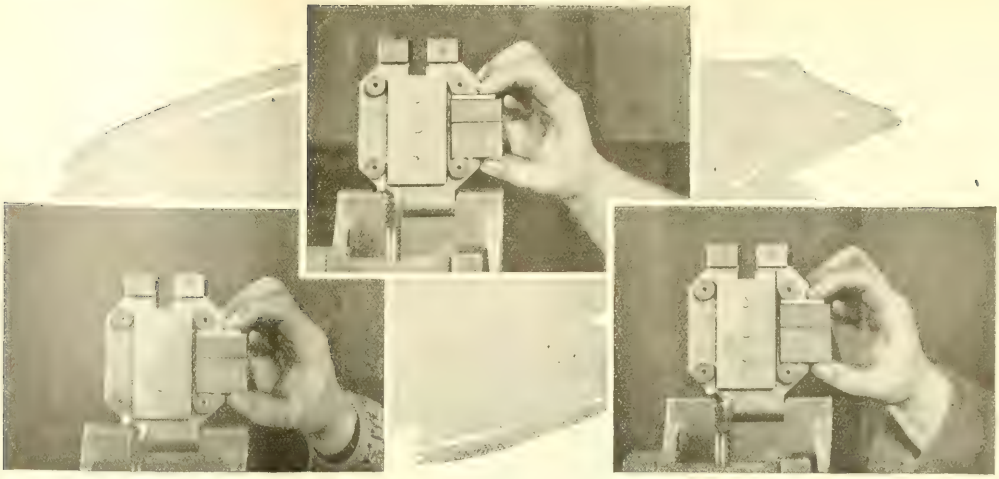

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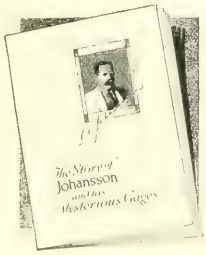

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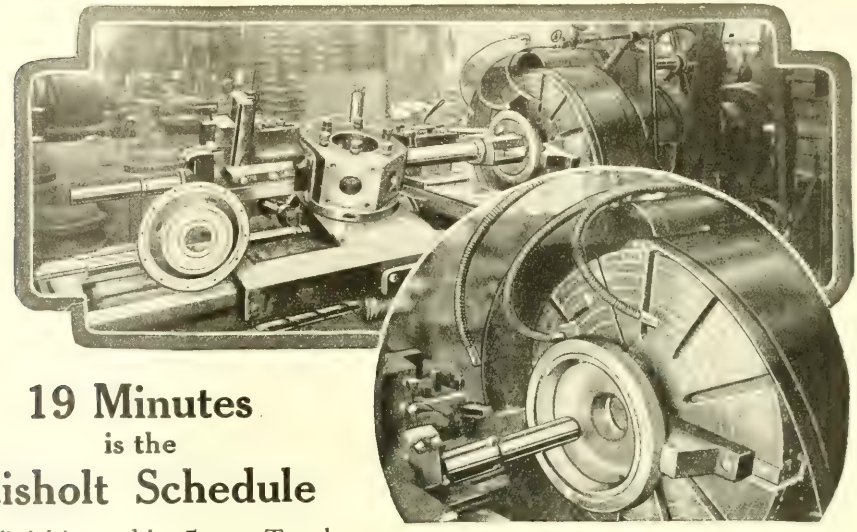

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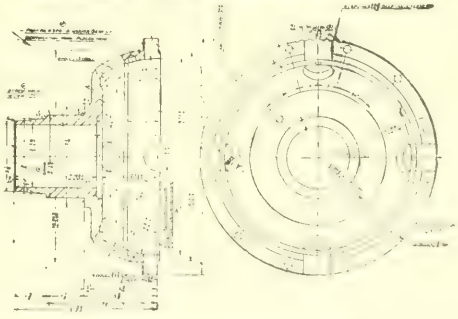

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CANADIAN MACHINERY
AND
MANUFACTURING NEWS

Vol. XXII No. [illegible] December 18, 1919

Various Types of Cold Chisels and Their Uses*

Planing, Shaping, Milling and Other Machine Operations Have Decreased the Chisel's Field of Usefulness. There Remains, However, a Place for the Humble Chisel as This Article Will Show

NEXT to the file, the cold or chipping-chisel is the most useful tool employed for the cutting of metal where hand work is necessary. In the early days, when planning and shaping machines were scarcely developed, this tool held prime place as a roughing appliance, preparatory to finishing with the file. All this laborious work has been abolished by the introduction of planing, shaping, milling, grinding, and keyway cutting machines, and such regular operations are only performed by hand when it is impossible to use the machines, as on breakdown jobs, emergencies, situations where the work cannot be removed conveniently to take to the machines, and out-door jobs. But, apart from such cases, the chisel fills a [illegible] place still at the bench, and in particularly for girder and bridge work and shipbuilding, in which tough steel has to be cut.

A glance at the principal types of chisels in common use may be first taken, as there are a good many differing varieties of work which require a particular shape of chisel to cope with them. For ordinary chipping of surfaces, cutting off lumps, serving lengths of material, and general cutting, the common chisel, A, Fig. 1, is employed, having an edge exceeding the width of the stem portion; the latter is sometimes made much longer for reaching into places where the ordinary length will not go, and to give leverage for forcing and prising purposes, as when to see the edge. The diamond point and the round-nose chisels, D and E, are selected chiefly for making grooves, such as those for draining purposes, or for leading in oil, and for serving pipes and other shapes by nicking round. Oil-groove chisels, F, are round-nose, but bent to enable them to be used in the concavities of bearings, brasses and pulleys. For heavy duty round-nose cape chisels, G, afford a stronger shape. At H is illustrated a round-nose with larger curve, suited for cutting concavities less pronounced than oil-grooves, as well as for cutting out circles in sheet metal, a further development for this function being the cow-mouth type, J. Another modification, seen at K, is

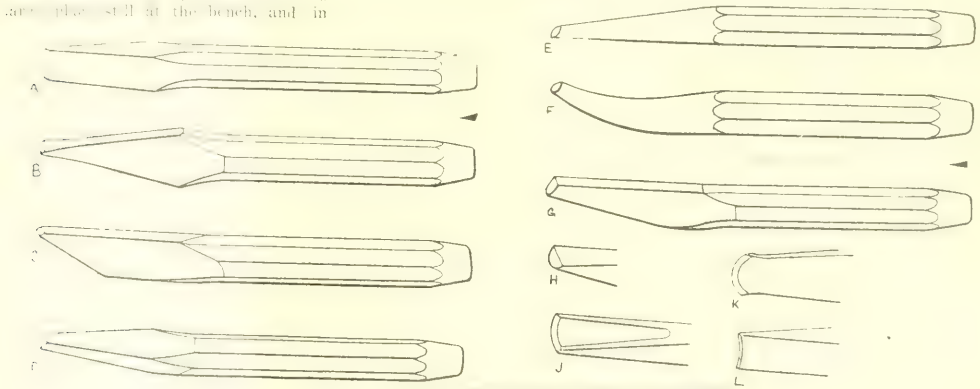


FIG. 1 ILLUSTRATING VARIOUS STYLES OF CHISELS

power-plants, on railway and tramway jobs, gas, water and pipe undertakings generally, being adapted for cutting various shapes of surfaces, removing superfluous pieces of metal, cutting grooves, slots, holes, and parting off wire, rods, bars, pipes, sheets, corrugated iron, girders, etc. With the introduction of pneumatic hammers the chisel has had its capacities immensely increased, par-

necessary on some breaking up and repair work. In some cases where the width of edge of this ordinary chisel prevents it being used, the "cape" chisel has to be employed; this is narrow, and thickened up for strength in the vertical direction, B. There is a modification of it utilized for key-seating purposes, C, that is cutting key-grooves, etc., where the one-sided formation is more convenient for manipulation, and it is easier

shaped for severing corrugated iron, the edge being ground to a quick curve, while a hollow-ground edge, L, is sometimes used for pipe-cutting, being much less likely to slip when working round the circle.

The section of steel chosen for a chisel of standard size is usually octagon, because this gives a firm grip with the minimum tendency to twist during the hammering, combined with

the least fatigue to the hand. Another section largely utilized is round, with flats or [illegible], giving a comfortable grip. But in the smaller chisels for fine work, where the hold is generally between thumb and fingers, a round section, plain or knurled, is suitable, and square section is also convenient, being a little less trouble than round to keep from twisting.

One of the troubles incidental to chipping is that of obtaining the correct temper of the chisel edge. If too soft for the purpose the edge soon goes, preventing neat work, and adding to the labor; if too hard the edge is likely to shiver to pieces, or break out piecemeal. The results, however, depend upon the material under treatment, the severity of the blows, and the skill of the craftsman. A very hard chisel may successfully endure on light duty, that is, penetrating soft materials, taking light cuts, and struck skilfully with fairly directed blows; while on hard stuff, or if sent too deeply in, or struck awry, the edge may go to pieces immediately. The advantage of using a hard chisel is that its edge lasts keen so long, and much better work may be therefore done, with less waste of time and of steel incurred through sharpening. The method of tempering a chisel is to heat the nose up for a length of two inches or so to a bright red, and quench in water for a few moments, leaving the stem still hot. The chisel is then withdrawn from the water, the end rubbed bright with a bit of broken grindstone or emery wheel to obtain a small patch on which to watch the color. This begins to creep along, due to the spread of the heat in the body, and the tool is completely quenched when the appropriate shade of straw color shows. The pale straw is suitable for average service, and a darker shade should be chosen for the severest duties, where the hardness or toughness of the material opposes great resistance to penetration.

The edge of a chipping chisel, like other cutting tools, is nothing more than a wedge, and the keener it is ground the more easy will penetration be. But the limitation of strength comes in, and too keen an edge will either dull, turn over, or shiver to pieces. The included cutting angle is therefore made from 45 deg. to 60 deg., and re-sharpening (as well as easy cutting) is facilitated by forging the end thin, Fig. 2, A, leaving short grinding facets, and freedom for the cuttings to slide up into the air. The angle at which the chisel is held, B, is approximately 45 deg., varying according to the cut, the ground angle of the cutting edge, and the quality of the material. On soft stuff, where penetration is easy, the chisel may lay lower down and be driven along with facility, while in hard metals, which break off in short bits, the chisel must be tipped more towards the vertical, particularly when starting a cut afresh. The edge should always be pushed up to the cut before rather than near the nose, the latter position being liable to let the head wobble about. There is no advantage in having a large area of head surface (with a mistaken idea of lessening the chances of misses) because such an expanse causes difficulty in getting on a fair direct blow. The top should be ground round to a neat chamber, and trimmed as often as rags are beaten out by the hammering. To leave these ragged overhanging edges on is rather dangerous, because a chance unlucky blow at one side might drive the fringe off and down into the worker's hand. The edge of a chisel when required for going over a flat surface, or for severing purposes, ought not to be ground straight across, but with a little convexity, Fig. 2, C; the idea of this is to render guidance easier, from the fact that the corners do not pull into the metal and tend to draw the chisel out of its path, and moreover, they are not so likely to be broken off by concussion. When one desires to chip a very flat, true surface, especially at a finishing cut, the degree of convexity ground on the edge should be very slight indeed, so as to prevent chipping a series of hollows.

The removal of a considerable quantity of metal from a face is not best accomplished by employing the ordinary wide chisel, as this takes a lot of heavy slogging, and the width of the chips (in fibrous materials especially) renders their bending up a laborious task at each blow. The use of the narrower cape chisels is better, running a series of grooves across, after which the chipping down of the ridges thereby produced is easy—see section D. This also shows chamfering of the edges before commencing to chip, the depth of chamfer corresponding to the depth of the material to be removed. The chamfer all round serves two purposes: (1) to act as a guide to the eye without scrutinizing a scribed line frequently; (2) to prevent the breaking out of the edges when the chisel works towards an edge. After a face has been fairly reduced, its flatness can be assisted by frequently changing the attitude of the chisel, setting it diagonally to the last series of cuts so as to top off the ridges and avoid the formation and perpetuation of hollows, this being done by changing one's foothold on the floor, shifting around the vice or the work.

Chipping interior surfaces is sometimes awkward on account of the difficulty of seeing the results, and the narrowness of apertures. Occasionally it becomes necessary to grind a chisel similarly to one for wood—i.e., with facet on one side only, E—in order to be able to lower the tool enough to pass through the hole or slot.

This often arises in producing square or rectangular or other apertures from solid metal, subsequently to drilling out

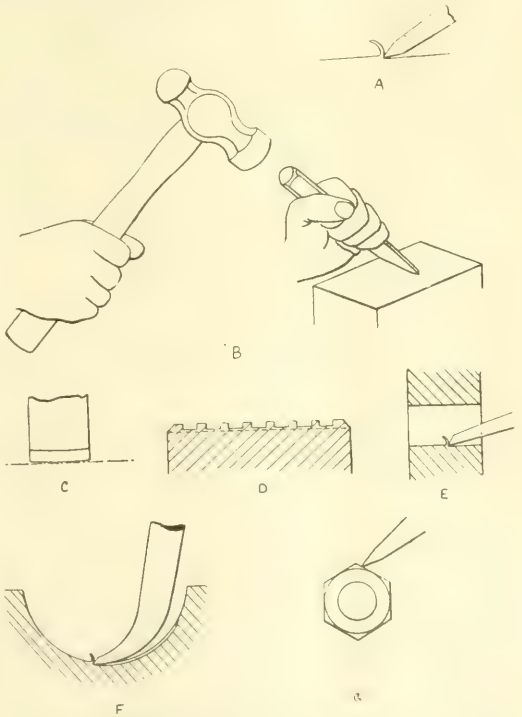


FIG. 2—ILLUSTRATING USES OF THE VARIOUS STYLE CHISELS.

the bulk of the stuff. The round-nose chisel, if used for chipping oil-grooves in bores, takes up a similar attitude, but in cutting around a curve, as when oil-grooves are disposed spirally, a straight-backed cannot be used without digging in too deeply, hence the back is curved for this operation, F. The groove is chipped by judging the direction with the eye, or a line is marked by laying a strip of thin card or zinc around the curve and scribing a line along, guiding the scriber by the edge of the strip. If the chipping is performed neatly, very little filing will be required to make a smooth finish. The end of a rat-tail file will have to be bent to enable this to be done, heating the file for a distance of about ¾ inch to a red, and knocking it round the edge of a block of wood, afterwards re-heating to bright red and quenching.

Apart from legitimate chipping, the cold chisel is handy for odd jobs, such as forcing open joints that have rusted up, knocking off scale and rust, cutting off rivet and bolt heads, and loosening rusted nuts. The last-named job is done by striking against a corner of the nut, G, the jarring effect being very useful in starting to loosen. The chisel edge should not be sharp for this purpose, or it will simply chip the corner off without producing the desired result. Sometimes a special chisel is kept for these emergencies, having its edge ground off blunt, and occasionally a hard brass or gunmetal one is used for loosening bright nuts that ought not to be spoiled.

Canadian Machinery Drafting Course—Part IX

A Further Discussion on the Art of Projection. Students Should Study This Portion Slowly, Making Sure They Grasp the Underlying Fundamental Principles

By J. H. MOORE, Associate Editor Canadian Machinery

SO far in this course we have taken up two plates in projection, but not any examples of what would happen in the event of a cone or cylinder being intersected by a plane.

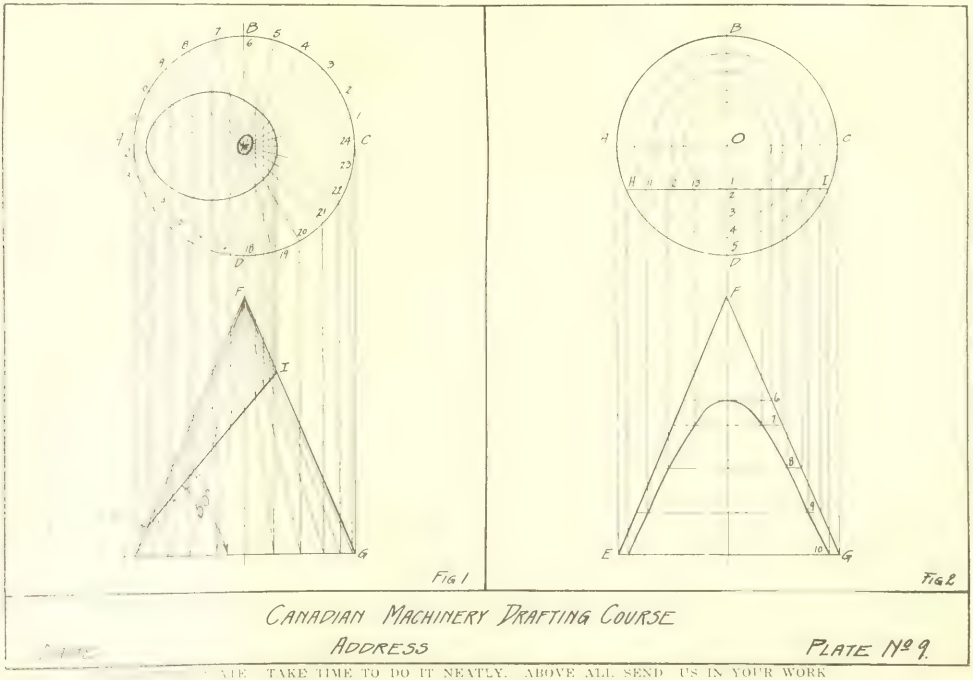
In this section we will discuss just the point spoken of above, and discover what occurs when a plane and cone meet.

Different curves are formed when such occurs, and two illustrations in the shape of Figs. 1 and 2, from plate No. 9.

If the plane of intersection is perpendicular to the axes of the cone, or cylinder, the curve of the intersection will be a circle, but if it is inclined to the axis it will be an ellipse in case of a cylinder, and an ellipse, hyperbola, or parabola, in the case of a cone, all depending on the angle of inclination.

Fig. 1 illustrates a cone cut by a plane, which, although cutting the cone, does not intersect the base of the cone. When the cutting plane does not intersect the base of the cone, the curve of intersection will be a true ellipse. Had the plane cut through the base the curve would have been a parabola.

To construct Fig. 1, proceed as follows: First, draw the plan view of cone base, by means of the circle, A, B, C, D; make this 3 in. diameter; divide this circle into 24 equal parts, as shown; from each point of intersection project down vertical lines until they meet at the base of the cone, E G, in the other view; this line can be placed to suit your own convenience. Make the distance vertically from this base to the point, or apex F 3½ in.; let the intersecting line, H I, start anywhere about where is shown on the plate, and let it form an



angle of 50 degrees with the horizontal.

From each of the intersecting points on the base of cone draw lines directly up to the apex F. Where these lines intersect with the plane line, H I, erect perpendicular projection lines up into the plan view. These lines are produced until they meet with the various radial lines on the plan view, such as 0, 11, 0, 10, and so on. The intersecting points in these lines form the contour of the ellipse to be drawn. Readers will, no doubt, have followed this description closely, and will now be able to proceed to draw this figure in place. Above all, study the work before drawing, for it is important that not only the principle be understood, but that care be taken. Without the proper care, the figure is useless, for it will not be a true projection.

In laying out these figures previous to inking in, be sure you do not use a softer pencil than 4H. If you use a 4H be sure the point is good and sharp, for blurry lines will be a great drawback to you in this work, and especially on this plate.

If students will only play safe, go easy, and keep their wits about them, this plate should not cause exceptional trouble.

Fig. 2. We now come to an entirely different proposition, namely, that the vertical plane, H I, is parallel to the axis of the cone. In this instance the curve, when found, will appear in its true shape and size, as the plane H I is parallel to the vertical. Students will note the method of solution.

The first step is to, of course, draw the cone, plan, and elevation views as before. The same sizes exist in this figure as the last.

Draw the line H I any place to suit, say, approximately, 5-8 in. away from the centre line, as shown. Now construct a circle tangent to this line, as illustrated at 1. Between the space 1 and D divide the distance up as you see fit. In this case the writer has shown 5 divisions, although he could equally as well have shown 12, or more, for the greater the number of divisions the more accurate the curve, but for the principle of the idea, the writer thought 5 sufficient.

From these circles on the centre line, A C, project down lines meeting with the elevation view of cone. Construct horizontal lines from these points as shown. It will be noted that a projection from the circle 0 1, lands the line down to the point 6, this point being in turn projected horizontally to locate the top of the curve, which in this case is a hyperbola.

From the points H, 11, 12, 13, etc., to I, vertical lines are projected down, these intersecting at points 7, 8, 9, 10, and, of course, in similar manner on the other side of the curve. By joining these various points found we construct our curve as shown.

For students' benefit and reference let us consider what we have found:

We have come to the knowledge that when a cone is cut by a plane which does not intersect the base, we construct as the curve of intersection, an ellipse. (Note, a true ellipse, and not an egg-shaped oval).

That in the event of the cutting plane passing through the base of the cone, we construct as the intersecting curve a parabola.

That when the cutting plane is parallel to the axis of the cone and perpendicular to the vertical plane, we secure as the curve of intersection a hyperbola.

There is one other point could be spoken of, namely, that in the case of a cylinder, which has a cutting plane running through its length at an angle, the resultant curve will be an ellipse.

Students cannot do better than memorize these points, as they come in handy when we get on further in the course.

So now to work on Plate No. 9. Stick to it, make sure you are accurate in your projections, dimensions, etc., and exercise great care when inking in. Above all, let us see your work for inspection. If you haven't so far landed a prize, there is no time like the present.

Cut out and send with drawing

Name .....

Address .....

Position .....

Firm's name.....

A NEW RIVET FORGE

A rivet heating forge of a new type, the invention of an employee of the Pacific Coast Shipbuilding Company, is described in "Full Speed Ahead," the paper published at the plant of the company on Suisun Bay, thirty-five miles east of San Francisco. The account says:

An improved oil forge for heating rivets has been devised by J. T. Shepherd, plant plumber. Several of the forges are already at work. One of their most commendable features is the avoidance of backfire. Higher vaporization of the oil is secured through the use of the new invention.

The main features are a valve on the air line and a needle valve on the oil supply, with a mixing chamber. The latter is formed of a 1¼-inch T with a 1¼-inch nipple and a bell reducer reducing to ⅜. Above this is a second mixing chamber, formed of a 1-inch ell, the oil being carried then through a ½-inch T with a ⅜-inch nipple, forming an injector. Free oxygen is taken in with the vapor.

There is a ¼-inch vent on the tank, to make filling quicker, the vent forming a suction on the funnel. It is not necessary for the boy to go to the manifold to turn the air off. This is done right at the furnace. Another advantage is that the new forge needs no labor to connect the hose. A male hose connection is used, obviating two couplings.

The piping on the end where the valves are controlled is protected with a stay plate, reducing the danger of damage to the forge. The danger of backfire is eliminated by fire clay sealing.

The forges are also equipped with bleed valves, making it possible to clean out the tanks easily. Not only can water be bled from the oil, but the bottom of the tank can be blown clean.

Shepherd, who has been working on the forge design for some time, gave it to the company as a contribution to the yard's productivity.

COAXING WINDMILLS IN DENMARK

During the coal famine caused by the war many attempts were made, especially in Denmark, to improve the working of the windmills geared to dynamos to generate electricity. About 250 installations on farms and small estates have proved fairly satisfactory. Many experiments in this connection were carried out by the late Mr. P. la Cour, and a trial mill designed by him is still being used for observation purposes. During about one-third of the year there was either complete absence or excess of wind, and the force available was very variable. It was nevertheless found possible to save fuel for steam or gas-driven power producers. The cost per kilowatt from peat gas-fired plants is approximately the same as from a windmill-driven installation. Attempts were made to design special three-phase dynamos capable of maintaining constant voltage independent of the speed of the mill, special attention being also paid to automatic adjustment of the sails in order to reduce the cost of attendance

What About Elevator Hazards and the Public?

The Elevator Has Dangerous Possibilities in Spite of Its Excellent Service. The Following Paper Read Before the Annual Congress of the National Safety Council Gives a Resume of Elevator Hazards

By DANA WEBSTER, Aetna Life Insurance Co., Indianapolis

BEFORE making any remarks on the safety of elevators, it might be interesting to cover, briefly, the gradual development in the manufacture of mechanical lifting devices.

Mechanical Lifting Devices

Lifting devices were undoubtedly used by Julius Caesar as far back as 256 B.C., as history mentions their lifting animals from the dens to the arena in the Coliseum of Rome. About the middle of the Nineteenth Century, platforms or cable-hoisted elevators were first installed in New York and Boston, but were not provided with any kind of safety devices, and, strange to say, you can find a few elevators without safety devices at the present time.

A few years later elevators were equipped with safety devices of such type that it was necessary for the hoist cable to break before the safety could actuate. There are a great many of this type of safety in use to-day, but with the introduction of high-speed elevators, which were required to meet the demands of the public, quite naturally it necessitated much better type of safety apparatus and a multiplicity of cables.

Accidents could, and did occur, from over-speeding elevators, caused by disarrangements of the controlling apparatus, and it became necessary to provide safety devices that would actuate should the elevator speed increase beyond a predetermined number of feet per minute.

The most essential elements of safety are the prevention of excessive speed from any cause, the over-running of the limits of travel at top and bottom, safe protection at the landing entrances to the elevator, and a regular examination of the cables and all parts of the elevator equipments.

Car Safety Device

The early type of the safety device was designed to stop the car instantaneously. They served the purpose satisfactorily for slow speed, but were not adequate for the higher speed of 400 to 700 feet per minute. It, therefore, became necessary to provide a safety device that would stop the car with an easy and gradual stop. This is accomplished by the friction clamp safety, which is actuated by a safety speed governor, usually set to trip at 40 per cent. above regular speed. This governor will act should the hoist cable break, allowing the car to drop, or should the car over-speed from some defect in the machinery after the governor trips and the car has dropped far enough to take up the clearance of the safety jaws. The jaws are forced hard against the guide rail (like a vice), and the car will continue to slide until the friction is enough to stop the car entirely. The distance the car will slide after the safety takes hold, depends upon the load; but the farther the car slides the tighter the safety grips the rail. Usually, a car will drop about six feet after the governor trips and clamps the governor cable.

Over-running of Limit Stop

The machine of all power-operated elevators should be equipped with automatic limit stops; that is, a device that will stop the elevator at the top and bottom limit of travel, regardless of the operator.

On Drum machines, the Automatic Limit Stop should be built with and made a part of the machine.

On Hydraulic elevators, the Automatic Limit Stop should consist of a Cut-off Valve, either in the to-and-from pipe, or in both the supply and discharge pipe.

On Traction type of elevators, the Automatic Limit Stops must be located in the hoistway, and the power cut off by the travel of the car. As there is more or less slippage of the hoist cables on the drive sheave, a machine automatic would not be dependable. In addition to automatic limit stops on electric elevators, there are hoistway limit switches located so that, should the car travel a certain distance by the automatic limit stop, the car would open a switch, thus cutting off the power and stopping the machine.

Safe Protection at Landings

The early types of passenger elevators —and, in fact, most elevators up to the present time—are provided with landing doors equipped with a catch located on the inside, so that the door can only be opened by the operator. The operator, however, in order to make speed—and the public is partly to blame for this—starts the elevator before the door is closed, and quite often the door would not fully close and latch, thus providing a very dangerous condition. Many persons have opened the door when finding it ajar, and, looking in the hoistway, have either fallen or have been knocked down the hoistway by the car and severely injured or killed. I might say, right here, that statistics show that 85 to 90 per cent. of all elevator accidents occur at the landing doors. Therefore, it became necessary to provide the landing doors with a locking device that would prevent the doors from being opened, unless the car was at the landing; also to prevent the car from being removed away from the landing until the landing doors were closed. This is termed the Interlocking Device, or Interlocks for Landing Doors. While I believe all landing doors of passenger elevators and gates for freight elevators should be equipped with interlocks, I am sorry to say that, at the present time, only a small percentage of elevators are equipped with this device, although they are becoming more and more in general use.

Cables

The Cables are the most essential parts of the elevator equipment, and their number and size should be equal to the load with a good factor of safety. The sheave should be of ample size, and placed in alignment, to prevent chaffing of the cables on the sides.

Great credit must be given to the manufacturers for the high state of perfection these devices have brought. This fact must be admitted when considering the few accidents on elevators, compared to the large number of passengers carried. Statistics show that 10,000,000 passengers are carried in the Borough of Manhattan daily, and it is said that this number exceeds the number of passengers that ride on all the surface, elevated, and subway cars; in other words—more people ride vertically than horizontally.

A great many elevator accidents are not due to faulty design in construction, machinery, or safety device, but to the carelessness of the injured party. It, therefore, becomes necessary for the City or State to enact Ordinances and Laws regulating the construction of elevators, and enforcing their equipment with effective safety devices, in the interest of accident prevention; that is to say—to prevent a person from being injured by his own carelessness, and also by the carelessness of the operator.

Elevator Inspection

Are the Safety Devices Kept in Proper Condition? is one important question. The only way this can be accomplished is by having the elevator regularly inspected by a competent elevator inspector, who should inspect all the different safety devices, machinery, cables, etc., in fact, everything pertaining to the elevator. The landing doors should be tried to determine whether they can be opened from the outside. The car safety device should be tested to be sure that it would actuate

and hold the car from falling, should the cable break. The automatic limit stops should be tested so as to be sure the car will not over-run and strike the overhead beams or bumpers. The slack cable device should be tested to be positive the power would be cut off should the cables slacken. The brake should be examined to be sure there is no slippage. The cables should be examined very carefully for defects, as there is no part of an elevator that requires the exercise of more good judgment than the examination of the cables. It is just as essential that the safety devices, and all parts of the elevator, be kept in good working order, as it is that they should be installed in the first place. After an inspection has been made, the owner should proceed immediately to install safeguards and remedy any defects reported.

The elevator should be oiled and greased regularly by the engineer, and looked over carefully for any defects, and not wait for an inspector to make a thorough inspection, and oftentimes the engineer will discover some little defect which, if fixed immediately, may avoid a serious accident.

There is another feature that I wish to mention before closing; that is, the elimination of mirrors, in fact all glass, from the passenger cars (except the electric light bulbs), not only because of the fact that they are liable to cause injury to passengers by getting broken, but also because of their attraction, which results in passengers failing to notify the operator promptly as to their destination. This necessitates a stop between floors, and a trip back to let them off. They also have a tendency to retard the loading and unloading of the cars.

What Plan Do You Adopt in Estimating Costs?

Do You Calculate the Total Weight of the Machine, or Apparatus, Then Guess at a Price Per Pound, or Do You Attack the Problem in a Systematic Manner?

By JOHN S. WATTS

THE usual method followed in making up an estimate for quoting on an inquiry is to calculate the total weight of the machine or apparatus in question, and then guess at a price per pound, taking as a basis the cost per pound of the most similar piece of work done previously.

While this method, if good judgment is used, will give fairly accurate results, if the job being estimated on is similar in every respect to the one taken as the base for the pound price, it is very seldom that this condition is fulfilled.

As a general thing in the small shop, the work to be quoted on consists of special machinery to the customer's drawings, and in taking the cost per pound of a certain type of machine made to one firm's design as a criterion on which to base the price per pound of a similar type of machine to another company's drawing, we are likely to be led astray, because one design will most likely have more weight of material for a given amount of machine work than the other, the two machines having been designed by different men, with different ideas, and to work under different conditions.

Another common method is to calculate from the drawings the cost of the raw material, i.e., plates, shapes, castings, etc., entering into its manufacture, and then, submit the drawings to the foreman in each department for his estimate of the labor cost in his department.

This is, outside of the estimated cost of the raw material, nothing but a guess. Very few, if any foremen have sufficient data on which to make an intelligent estimate. For instance, a foreman, especially in the small shop, has no time to spare for this work, nor should he be expected to attempt it, as by so doing he is compelled to neglect his proper function.

Estimating Costs in the Small Shop

The foreman will generally glance over the drawings and make some kind of a mental estimate (a euphemism for guess) as to about how many days' work will finish the job, and put in his estimate accordingly, with every intention of living up to the estimate, if not in actual fact, then at any rate by making the time sheets to agree with the estimate, soaking the balance on to some job that is not estimated on. This procedure makes some jobs so expensive that the customer kicks, and the costs of the job estimated on, as shown by the books, are below the actual cost, and are misleading and apt to lead the shop into losing money on future work through taking the cost of this job as a basis for quotations on similar work.

The system used by the writer for some years with gratifying results, is based on the fact that for similar operations on similar parts, the time consumed in doing the work will be proportional to the area to be machined.

To start with, whoever is going to do the estimating should split up the operations on each piece into boring, planing, turning, etc., and calculate the area in square inches for each operation of the surface to be machined.

Until data have been accumulated from actual work performed the area that can be machined by the various processes per hour will have to be estimated, but when the work estimated on has been done, the actual time can be used and the estimating changed from guess-work to a simple arithmetical problem, taking only a few minutes to solve.

In the case of boring, drilling, or turning, it is easier and just as accurate to take, instead of the area, the diameter of the piece or hole and multiply by the length of the machined surface, as both quantities are in direct proportion to each other.

To have these figures easily accessible, a card index should be used, the information being written directly on the cards about as follows:

Estimating Costs in the Small Shop

The heading of the card signifies that it is for data on boring straight holes in iron castings, that is parallel holes without keyseat, and the hub faces left rough. The first column gives a general idea of the part in question, and is neces-

Boring Straight Hole in C.I.

Part	Dwg. No.	Machined Surface	Area or DXL	Hours	Area or DXL per Hour
Rope Sheave 36" diam.	1125-B	2¼" Bore— 3¼" Long	7.875	.501 .50 = 1.01	1.9

ONE STYLE OF CARD USED.

...would take longer ... bore in an awkward ... that had to be clamped ... position; warranted ... would be appropriated ...

The second column gives the drawing ... might be necessary to refer to it for comparison with other work to be quoted on.

The third column gives the dimensions of the machined surface so that in estimating other jobs we can pick out for our basis the nearest size we have data on the card. It being understood that while only one job is shown on the sample card above, in practice other jobs of the same class would be entered on the card as data was gathered in time.

The fourth column gives the area of the machined surface, or in the case of boring, etc., the diameter multiplied by the length, as explained above.

The fifth column, which is not filled in until completion of the work, gives the hours per part. In the example the figures $\frac{80\frac{1}{2}}{50}$ mean that 80½ hours were consumed in boring 50 sheaves, giving 1.61 hours as the time for one sheave. This 1.61, divided into the figure 7.875 in the fourth column, gives us the figure 4.9 in the last column.

It should be understood that the time taken includes all the time charged against the job, that is setting up machine, trueing up in lathe, etc., and the time of any helpers that may have been necessary.

Now, if we are called upon to estimate the labor cost of boring some 24 in. ... sheaves with a 3 in. hole, 4 in. long, the formula is:

$$\frac{D \times L}{\text{hours}} = \frac{4.9}{3 \times 4} = 2.45 \text{ hours}$$

From the card, we note that the 4.9 was taken on an order of 50 sheaves, so if the number of 24 in. sheaves to be bored is larger or smaller than 50, we would decrease or increase the 2.45 hours ...

By putting this system into effect, in the course of time we will accumulate ... all the usual ... and which will ... for the ...

The ... involved ... soon, by ... running ... around to interview the foremen, save time.

Also, it will cut the losses incurred by underestimating, and also help to avoid losing work by overestimating.

It is not possible, nor would it serve any useful purpose, to try and get every job that went through the shop on these cards. The aim should be to get a line on all the various kinds of operations going through the shop. Some operations such as boring and keyseating can be lumped together on the one card as though they were only one operation.

...	...	AREA OR DIAM.	HOURS	AREA OR DIAM. PER HOUR
...	...	7.875	...	4.9

ILLUSTRATING THE FIRST CARD DESCRIBED.

WHY IS WELDING PROFITABLE?

Continued from page 603

in fact, for more things than there is time to mention herein. In connection with the cutting torch, the welding plant is useful for shearing and punching, chaping and straightening, cutting and splitting, in places inaccessible to any other method. The process may be utilized for removing carbon from tractor, auto and truck engine cylinders. In fact, it is hard to see where the objectors base their claim that the welding plant is liable to stand idle part of the time, unless they mean they would not get out and hunt up the business. There is plenty of work for the welder in the country right now; what will it be when things get going good?

And while we are on the subject of possibilities let us not forget the airplane. Here is something that is more than a possibility. The time is at hand when we will be using the air for means of transportation and pleasure to an extent little dreamed a year or so back. Already it is a common sight to see an air craft sailing over any section of the country. With Federal backing it will advance rapidly from now on. And this means opportunities for the torch operator. Many parts of the airplane absolutely demand wedded joints both as a factor of safety and to cheapen the machine. The principal cities over the country are planning landing grounds and otherwise preparing for the advent of the airplane. The welder should be on hand to make the repairs when needed.

As a closing argument let us review a list of people who need the welding machines. Who not only use them but must have them if they hope to cope with competition on all sides: First the repair man who can not get along without a plant. Then the foundryman, in steel, brass and iron; the junk dealer; the garage owner; the blacksmith; the miner; the contractor; the railroad; the electric power company; the shipbuilder and general manufacturer. Perhaps many more could be named but this list should remove any doubts as to the usefulness of the modern welding plant.

Yes, it is perfectly safe to purchase the welding plant you have been thinking of. Cut in now and get in on the beginning of things. It is a good idea to add to your present equipment if you already own a good plant. If it is an old-fashioned outfit you should investigate the advantages of a more modern machine. Don't get the idea that there will not be work enough to go around. And don't think the method is not a success. Also don't think you cannot learn to operate a welder as well as the other fellow. It is only a matter of sticking to it.

PRODUCTION OF ASBESTOS INCREASING

The asbestos industry of the United States is in better condition now than ever before, especially as to the quantity and the grade produced, and the outlook is encouraging. Most of the asbestos used in the large asbestos factories of the United States comes from Canada, but the growing appreciation of the high quality American fiber, especially that from Arizona, is a welcome feature of the industry.

The total quantity of domestic asbestos sold in 1917, according to J. S. Diller, of the United States Geological Survey, Department of the Interior, was 1,683 short tons, valued at $506,056, an increase of about 13 per cent. in both quantity and value over 1916. Most of the domestic asbestos comes from Arizona, where the proportion of crude spinning fiber to that of lower grades is much larger than in Canada, so that the average price of American fiber in 1917 was $301 a ton, whereas the average price of that in Canada was only about $50.

Some years ago the opinion was expressed that as the Arizon fiber contains less iron than that mined in Canada, it is therefore better adapted to use for electrical insulation than the Canadian fiber. This opinion has lately been confirmed by analyses made by R. E. Zimmerman, of Pittsburgh, whose investigations also indicate that the harshness of certain parts of the Arizona asbestos is due to thin films of calcite among the fibers.

A small amount of spinning fiber was mined in Fremont County, Wyoming, from a contact deposit of remarkable interest.

The increased demands for asbestos due to the war have been met largely by increased imports from Canada. The imports of asbestos from South Africa and Italy have been largely cut off. The demand for imported asbestos for use in filters is being supplied by amphibole asbestos obtained from residual deposits of the crystalline rocks of Maryland.

A New Type of Water-Cooled Induction Furnace

This Style Furnace Can be Used to Advantage in the Making of Carbon-Free Melts. This Furnace Was Developed at Trenton, N.J.

By FRANK C. PERKINS

THE accompanying drawing, Fig. 1, and illustration, Fig. 2, show the design and construction of a new water-cooled high frequency induction furnace, developed at Trenton, N.J. There has been constructed a source of high frequency current of 10,000 cycles per second, which is utilized in power units up to one hundred kilowatts. The oscillatory current system forms the major portion of the high frequency induction furnace.

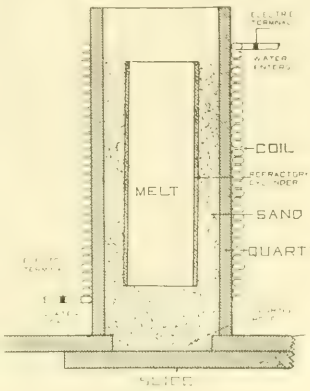
This special type of induction furnace is of advantage in the making of carbon free melts. The diagram, Fig. 1, is almost self-explanatory. The tremendous concentration of energy produced by inductive action in a comparatively small volume, makes it necessary to maintain the inductor coil cool by artificial means.

In order to accomplish this cooling in a simple and effective manner, the material used for winding the inductor coil is a thin-walled, flattened copper tubing. It is flattened and wound edgewise to obtain the maximum possible number of turns to the inch. A small flow of water through this tubular coil maintains it always at the temperature of the tap water used.

The melt, which is located within the inductor coil and which may be only ½ to 1 inch less in diameter than the inside diameter of the coil, may be raised to a temperature of 2500 deg. or 2800 deg. C., the coil remaining under 20 deg. C. The procedure in making a melt of any electrically conducting material such as electrolytic iron or nickel with which other metals are to be alloyed, is as follows:

There is a thin-walled crucible or open cylinder of fire-clay, magnesia, zirconia or like material formed and this is located centrally in the inductor coil and the space outside and under this cylinder is filled in with fine alumina, silica, or zirconia sand. The metal or component parts of the alloy to be produced is gotten into the form of small pieces, preferably about the size of walnuts, and packed in the thin walled cylinder. When the high frequency current is passed through the inductor coil rapid heating begins at once. This heating is due solely to the enormously large eddy currents which flow in the small conducting masses of the product being heated.

It is of interest to note that the melting of pure iron in lots of 2 to 5 lbs. begins in from 10 to 20 minutes and high superheat is reached in 25 minutes. When the mass has become completely molten, more material may be dropped in. The melted mass does not leak, even though the thin-walled container cracks and breaks, for this is embedded in a mass of sand which makes a natural metal-tight pocket. As soon as the mass becomes molten a very useful and interesting phenomenon is noted.



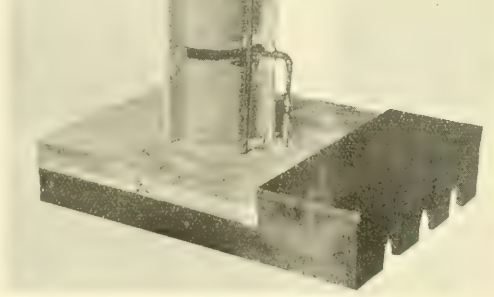
SECTION THROUGH FURNACE

The surface of the molten mass becomes much agitated and the central region of this surface is raised a considerable fraction of an inch above its circumferential region. The metal or alloy is, in fact, subjected to a vigorous stirring action. Metal flows vertically upward in the axial region and downward in the circumferential region, and thus an alloy becomes automatically most thoroughly mixed. This stirring action is not a thermal phenomenon, but is caused solely by the action of the electromagnetic forces. Its importance is easily recognized when a perfect mix of the constituents of the alloy is desired.

It is claimed that excellent results are readily obtained in this method of heating, as all conducting materials may be raised to 2500 deg., or 2800 deg. C., or to their vaporization temperature in an oxidizing atmosphere. Platinum is easily melted in this way. By placing the inductor coil on the outside of a quartz tube, which is closed at both top and bottom, melts may be made in any atmosphere or in vacuum.

It is also held that in the open type of furnace, the molten metal can be drawn off from the bottom into a mould and the quantity of metal, which can be handled at a single melt, is determined wholly by the size of the furnace employed and the power available. An inductor coil of 40 turns, 6 in. long by 3½ in. inside diameter, supplied with 10 to 20 k.w., will melt 4 lbs. of electrolytic nickel or iron at a charge in from 20 to 30 minutes. Larger furnaces supplied with larger power will handle larger quantities.

It is noted that Moissan's researches were chiefly concerned with the chemistry of the elements at the temperature of the arc. He studied the chemical reactions at elevated temperatures of the most refractory substances and compounds, producing oxides, phosphides, arsenides, carbides, and silicides of all the more refractory metals. He showed that the silicides of carbon possessed a hardness which approaches that of the diamond. His crystals of carbon silicide (carborundum) readily scratched the ruby.



GENERAL VIEW OF THE FURNACE.

was so
in kilo-
are fur-
naces. But these melts were all made
and the
resulting product, in the cases of the
always a
carbide of the metal and not the pure-
metal. Many years passed after the
work done by Moissan, before the soft
and ductile properties of pure molybden-
became known;
for small traces of carbon render these
metals, as well as many others, ex-
tremely hard and non-ductile. Platinum
and iridium, likewise, when melted in
the carbon arc, become hard and brittle
and their useful properties are largely
lost.

In the past, workers in metals of the platinum group have had to resort to the oxy-hydrogen flame for producing and refining their products. The usual electric furnace, which produces the highest temperatures obtainable artificially, is useless for this work, as in many other cases, because in all types of electric furnaces heretofore used for obtaining extremely high temperature, the product treated becomes chemically combined with the carbon invariably present.

While the higher temperatures have been obtained with tubes of iridium or tungsten used as a resistor, the first is precluded for general use by its excessive price and volatile nature when carried to a high temperature, and the second, besides being very high in cost, can only be used in an inert atmosphere or in a vacuum. A great need has therefore been felt in finding an electric method of melting and producing alloys of such pure metals as nickel, chromium, electrolytic iron, platinum and even iridium.

There are many who hold that the alloys of such metals, if produced absolutely free from all chemical contamination of carbon, silicon and every other element likely to be found in vapor state at the highest temperatures, will exhibit special and useful properties. Furthermore, it is recognized as highly important in heat treating the higher melting pure metals to be able to preserve absolutely their chemical purity.

It will be seen that with this device a method is now available and commercially perfected whereby any metal or alloy in granular form, in small broken pieces, or in solid masses, can be melted absolutely free from carbon and all other chemical contamination, provided this metal fuses at a temperature under the fusion temperature of pure zirconia. The only apparatus needed is a source of high frequency current of 10,000 cycles per second, or over, and the special type of induction furnace indicated in the photograph.

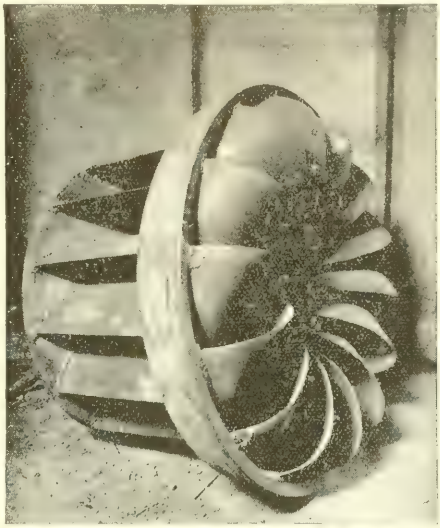
INTERNAL COMBUSTION ENGINE

In
to
the

Diesel oil engines which are being so largely adopted for marine purposes and for the generation of electricity on land. One recent innovation is intended to enable tar oil to be successfully used as the fuel. A pilot jet of paraffin is provided to form a flame for the following jet of tar oil, thus overcoming the difficulties of ignition. Another novelty which is of special interest to central station engineers is a device for automatically controlling the pressure of the air supply to suit the varying loads met with in the supply of electricity. On one and the same gauge is a pointer registering the air blast pressure and another controlled by the current passing through the generator. The second pointer is arranged to indicate the correct air pressure according to the load on the generator, and everything is in order when the two pointers are together, in which position they close an electrical circuit controlling the compressor throttle. When the pointers are apart, the throttle opens and increases the air supply until the pointers come together. Greatly improved combustion is secured by this ingenious device. Another British firm has introduced an emergency governor which stops the engine completely in case of an excessive rise in speed—an emergency which is beyond the ordinary governor. This apparatus works by by-passing the fuel into the atmosphere. Another emergency device stops the engine whenever the water circulation fails, the apparatus being operated by a diaphragm, which flattens when the water pressure upon it is withdrawn. All the British makers concerned in this field are standardizing their designs in order to provide the advantages of mass production.

WELDING REPAIRS TO WATER WHEEL

An electric welding repair job that is of considerable interest to the power plant operator and the mechanical engineering field in general, is shown in the accompanying illustration. In the initial construction of these water-wheels, difficulty has frequently been experienced in obtaining a firm and rigid connection where the vanes join the supporting rings. Generally speaking, the vanes are steel castings that are placed in position in the sand mold so that the molten iron will flow about the edges and form an integral casting. However, the result has often been unsatisfactory, as the subsequent expansion and contraction of the vanes and the rings causes a looseness in one or more of the connections. The peculiar construction of the vanes makes it difficult to use the oxy-acetylene process in uniting the vanes to the retaining rings, and relatively poor success has, so far, been obtained by the use of the electric process, when working together steel and cast iron. However, the St. Lawrence Welding Co., of Montreal, who accomplished the repair on the wheel here shown, have effectively formulated a special influx that overcomes former difficulties, and the vanes can be rigidly secured to the cast-iron rings, by means of the electric arc method, so that the force of a sledge upon any of the vanes will not produce the slightest defect in the welded joints. The cut shows the work immediately after welding; the rough appearance of the added metal was subsequently removed by grinding, leaving a smooth fillet weld in from the outer edges. Water-wheels treated in this way have shown greater efficiency after welding by this method.



BUILDING UP A WATERWHEEL RUNNER BY WELDING

WHAT OUR READERS THINK AND DO

Wanted: Views on the Subject of This Letter

Editor, CANADIAN MACHINERY:

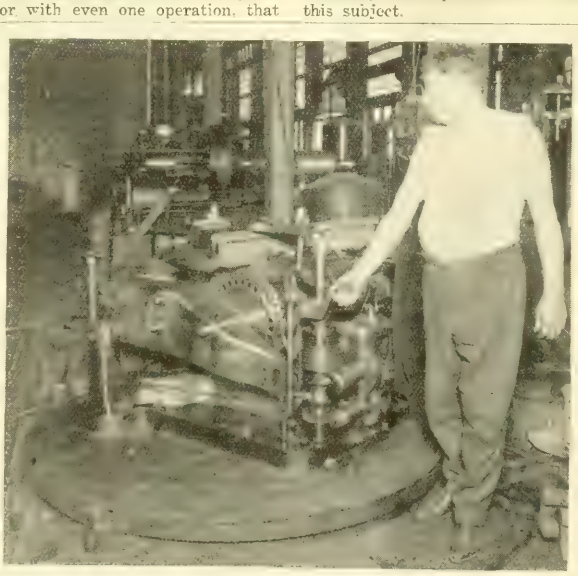
Dear Sir.—I take great interest in your mechanical drafting course, and note your reference to Mr. A. M. Lount, master mechanic for Massey-Harris. It is time some of the superintendents in this town sit up and take notice of the workman who is trying to get ahead of the game. Please let it be understood that the writer does not want, in any way, to discourage apprentices or workmen, but to give my honest opinion of conditions as I believe they are in most of the shops in Toronto to-day, I will quote a case in point. In one shop that I know of there is a young man, who, through home study, has got various ideas, and has submitted them to several firms where he has been employed. I might say at the start that he is one who is taking a course with the Scranton Schools, and his foreman is for ever running down these schools. Instead of giving the fellow encouragement it is entirely the opposite in this case. The young man conceived the idea that would have done away with one machine entirely in one operation, but would they try it out? Decidedly not. We hear much of this home study business. Is it worth while? Of course it helps one to hold down his job. The whole fault of the matter is this, that as soon as a man lets it be known that he can figure out ways and means of doing work in a more up-to-date manner than his foreman, then his foreman says: "I shall have to keep an eye on this fellow or by jingo he will be in my shoes before long." From this point on the poor fellow can look to his laurels. He is found fault with, and finally it is made so uncomfortable that he has to find fresh pastures, only to meet with the same rigmarole again. This is a true fact and can be proved up to the hilt. I appreciate such a man as Mr. Lount, as it shows that he does take an interest in his men, and if there were more of his kind there would not be so much antagonism between foreman and workman. I would say to the apprentice, stick to it; I am one who studies myself, and before long hope to be able to give something to the mechanical world that will be worth while. No doubt some of your readers will find for themselves that there are a lot of superintendents and foremen who are holding down jobs through the ideas of their workmen, who do not have the same opportunity of getting in touch with the heads of the concerns as their foremen have, and thus getting the credit every time for the ideas of their men. This state of affairs could be remedied by the offer of cash prizes for any improvements in the speeding up of production. Take for instance the following personal case: I was employed in one shop where they made a certain style of staple that could have been manufactured in two operations, or with even one operation, that at the present time goes through four. Why in the name of common sense is this allowed? Can someone explain? Yet this is only one of many cases I could point out. Hoping I have not taken up too much of your valuable space,

I remain,

Yours truly,

H. H. J.

Editor's note.—In our next issue we intend stating our views on this subject. In the meantime we will be pleased to hear from other readers, workmen, foremen, and superintendents alike on this subject.



HOW THE SAW OPERATES.

HANDLING LONG CUT-OFF JOBS IN CRAMPED PLACES

By J. J. McIntyre

The Cyrus Currier Co. of Newark, N.J., have to accomplish numerous cutting-off operations on railroad rails.

When the Earle-Rea Simplex saw, shown in the picture, was installed they secured it to a turntable, which can be clamped in a stationary position at any point in a circle. By this arrangement long lengths of rails can be cut at angles or loaded into machine from any point.

... DIS-

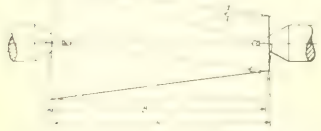
... ment.

... creases.

... The length of the work is A, if measured along the axis; if measured along the ... surface ... is B, and to get this length you would have to use a trigonometrical formula and B would equal

$$\frac{A}{\cos C}$$

where C is the angle which the side of the ... makes with the centre



THE IDEA EXPLAINED IN GRAPHIC FORM.

line. If the piece is threaded with a certain number of threads per inch, D, the number of ... in the whole length of the work, when threading by taper attachment would be A × D, but if threaded by the setting over of tail stock as shown by dotted lines in drawing the number of threads would be

$$\frac{A}{D \times \cos C}$$

or a greater number of threads, and consequently a finer pitch than with a taper attachment.

Example: Suppose the length A, measured parallel to the axis is 6 inches; assume ... threads per inch ... to be cut and the angle C is 15 deg., the number of ... in the whole length of the work ... when ... taper attachment would be ... 6 × 16 = 96. But the length B, shown by the dotted lines measured parallel to the outside, then the ...

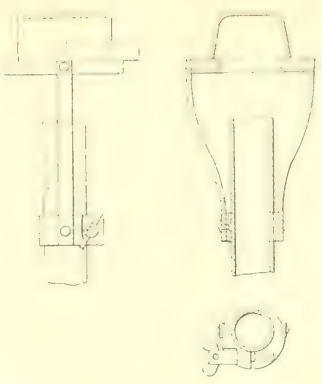
$$\frac{6}{\cos 15^\circ}$$

The cosine of 15 degrees from any engineer's bankbook is .9659; and

$$\frac{6}{.9659}$$

or nearly 6 7-32 inches.

... therefore ... 15 ... 96



TOOL HEATING SUPPORT FOR BUNSEN BURNER

By F. HORNER

For heating fine tools for bending, hardening and tempering, the Bunsen burner is handy. To save the time and trouble of holding a tool in the tongs, the attachment shown herewith is valuable. It consists of a couple of rings riveted together with distance pieces between, the rivets also holding bent arms that go down to a clamping ring pinched on the tube with a thumb-screw. To conserve the heat and reduce the length of time of heating up, a hood can be laid on top. A mark may be scratched upon the tube when the best height according to the flame has been ascertained, so that the split collar may afterwards set to this line.

... threads in the whole length of the work.

The second error would be that of a drunken thread. It is not a true continuous helic, and is due to the fact in taper trimming with the tail stock set over the work, does not turn with uniform angular velocity, while the tool is advancing along the work longitudinally with the uniform linear velocity.

The change of the pitch and the irregularity of the thread is so small it is not noticed with the naked eye, if the taper is slight.

But as the taper increases, the errors become more pronounced, therefore, the setting over of tail stock should be disregarded as much as possible.

There are a few wells in the United States between 7,000 and 8,000 feet deep. At 7,000 feet the temperature was found to be 152 deg. Fahr., and the rate of increase at this depth is about 1 deg. in every 51 feet. At this rate the temperature would be pretty close to the boiling point, 312 deg., at 10,000 feet. This has been the theory of scientists for years, and it is strange that more effort has not been made to find natural heat and put it to use. Boiling springs and burning volcanoes are proof that fire exists in the bowels of the earth and heat will undoubtedly be drawn from wells at some future date.

TABLE OF WEIGHTS AND MEASURES

Long Measure

12 Lines	1 Inch
12 Inches	1 Foot
3 Inches	1 Hand
3 Feet	1 Yard
6 Feet	1 Fathom
5½ Yards	1 Rod or Pole
40 Rods	1 Furlong
8 Furlongs	1 Mile
3 Miles	1 League
69½ Mile	1 Degree
1760 yds. or 5280 ft.	1 Mile
6075.81 ft.	1 Nautical Mile

Square or Land Measure

144 Sq. Inches	1 Sq. Foot
9 Sq. Feet	1 Sq. Yard
30¼ Yards	1 Sq. Rod
40 Perches or Rods	1 Rood
4 Rood	1 Acre
640 Acres	1 Sq. Mile

Cubic or Solid Measure

1728 Inches	1 Solid Foot
27 Feet	1 Solid Yard
40 Feet	1 Ton Shipping
128 Feet	1 Cord Wood

Land Survey Measure

7.92 Inches	1 Link
100 Links	1 Chain
1 Chain	66 Feet
10 Sq. Chains	1 Acre

English Money Table

4 Farthings	1 Penny
12 Pence	1 Shilling
20 Shillings	1 Pound

Avoirdupois Weight

16 Drams	1 Ounce
16 Ounces	1 Pound
14 Pounds	1 Stone
25 Pounds	1 Quarter, C
28 Pounds	1 Quarter, E
4 Quarters	1 Hundredw't
20 Hundredw't	1 Ton
2000 lbs. Av.	1 Ton
2240 lbs.	1 Long Ton

Paper

24 Sheets	1 Quire
20 Quires	1 Ream

Apothecaries' Weight

20 Grains	1 Scruple
3 Scruples	1 Dram
8 Drams	1 Ounce
12 Ounces	1 Pound

Troy Weight

24 Grains	1 Pennyweight
20 Pennyweights	1 Ounce
1 Ounce	1 Pound

Cloth Measure

2¼ Inches	1 Nail
4 Nails	1 Quarter
3 Quarters	1 Flemish E.
1 Quarter	1 Yard
5 Quarters	1 French E.
6 Quarters	1 French E.
37 Inches	1 Scotch E.

Measure of Capacity

4 Gill	1 Pint
2 Pint	1 Quart
4 Quarts	1 Gallon
9 Gallons	1 Firkin
36 Gallons	1 Barrel
63 Gallons	1 Hogshead

Dry Measure

2 Pints	1 Quart
8 Quarts	1 Gallon
8 Gallons	1 Peck
4 Pecks	1 Bushel
36 Bushels	1 Chaldron

Time Measure

60 Seconds	1 Minute
60 Minutes	1 Hour
24 Hours	1 Day
7 Days	1 Week
4 Weeks	1 Month
13 Months 1 Day	1 Year
365 Days	1 Common Year
366 Days	1 Leap Year

Days in the Month

30 days hath September,
April, June and November,
February has 28 alone,
And all the rest have 31;
But in Leap Year coming on
Give February one day more.

WELDING AND CUTTING

Why is Welding Profitable?

By DAVID BAXTER*

IF you are in doubt as to the advisability of installing an oxy-acetylene welding plant; if you think there are already too many engaged in the welding business; if you thing it is not a success as far as the process has been developed for all-round repair work; if you think there is liable to be a state of depression, of slack work in business in the future; if you think the welding business is not a paying one; in fact, if for any reason you are hesitating on the verge of purchasing a welding plant, you should read the encouraging prophecies, estimates and facts incorporated in this article.

If you already own a welder and are wondering whether or not to purchase additional equipment; if you think maybe you can rub along with your present outfit; if you think you can handle your share of the work in the future without the new improved accessories, supplies, etc.; if you have been dreaming around and have not kept posted with the facts concerning the tremendous era of development upon which this country has embarked; if you are out of date in equipment and information concerning the wonderful possibilities opening before the oxy-acetylene welder you should be interested in the following discussion.

If for any reason you think it takes a sort of super-mechanic to learn to operate the welding torch; if you believe it takes too much time and patience for the rewards to be earned; if you believe you would only have the plant sitting around idle half the time; in a word, if you do not know just exactly where you stand in relation to the welding business, the following article should prove interesting.

* * *

It is estimated in a recent issue of a leading automobile paper that the farms of America will absorb two million auto trucks in the next ten years. Can we realize what this means to the repair man, and especially the welder? Can we grasp the idea of the enormous amount of welding this great number of trucks will make? If we knew absolutely that there would soon be in use two million trucks, would it be possible to realize what this would mean to the owner or operator of a first-class welder? No doubt the figures would be staggering in their significance if we were able to put it in round numbers. It would seem almost impossible to get welders enough to keep the trucks in running order. And all of this would be on top of the thousands of passenger cars already in use together with the enormous number yet to come.

This estimate may be a trifle overdrawn, but those of us who have kept in touch with the highways movement of to-day can readily understand what it means to the truck business. Already some of the railroads admit that they are out of the running in so far as the short haul is concerned. The short distance hauling of freight in the near future will no doubt be done with motor trucks. Of course a great deal of this depends upon the rapidity with which the country adopts and installs good hard road systems. With the coming of hard roads comes the repair work for the welder. It is the truth in more ways than one that prosperity travels on hard roads.

Good roads are no detriment to the welder's business because the better the roads the harder they will drive and the quicker wear or break the trucks. It is scarcely necessary to make the reminder that all running machinery wears in time, so that even with the best of roads there will be plenty of work for the repair man. With the aid of the Federal Government there will be many roads built within the next year, and miles upon miles to be built in the following years. Now, if you believe in hard roads you must believe in the oxy-acetylene welder, for they will travel hand in hand.

So prepare for the business coming and install your plant, or get additional and better equipment if you now own a plant. Almost every part of a motor truck or automobile can be welded. In fact, this is the only method by which most of the parts can be repaired. Due to their shape and to the metal of which they are made, many of the different parts of motor cars would have to be thrown away if it were not for the modern method of welding. Such parts as crank cases, housing, crank shafts, etc., had to be discarded before the oxy-acetylene torch was devised.

For those who think there are too many welders in the business; consider the two million trucks for the farms, then to this add the trucks that will be used in the cities to accommodate this increase in volume of business. Then to that add the number of pleasure cars which will be bought with the profits of the double earning power of the trucks as compared with the slower team and wagon. You may say, "That is for the future, only a prospect. What about right now?" Well, just look around you and see how many torch operators who really understand their business are not busy. Ten chances to one you will find they are not complaining. You may find some idle plants, but you will also find they do not understand the work or else they do not let people know what they can do. No, there are not too many welders in the game. In fact, there is a scarcity right now, and what will it be when two million trucks are added to the list?

Those who are doubtful about the success of the oxy-acetylene process should turn to Government statistics. They will find therein where thousands of welders were used on all kinds of shipbuilding and war work. This is speaking of both the repair work and the manufacturing end of the business. One instance should convince the most skeptical concerning the success of the modern welding machine in repair work. Several of the largest ships that were taken from the Germans were found to be badly damaged. In fact, so badly damaged that it seemed impossible to ever repair them. The Germans had taken heavy hammers, bars, etc., and broken into many pieces some of the most essential engine and machine castings about the ships. Great complex castings that would require months to replace were found to be broken into several pieces while yet in place on the machine. Steel frames and bars were bent double in an effort to put the ship out of commission for a long time, and as the Germans hoped, permanently. If it hadn't been for the oxy-acetylene welder they would have succeeded, too! But the torch operator was put on the job and got the ships back in running condition in anywhere from one-tenth to one-half the time required to replace the castings. Now, if those large-

*From "Acetylene Journal."

kind can, ability

But you don't need to be told of the of the and a day in any good welding shop. You will find successfully handled. You will find that they weld castings weighing a ton or more just as effectively as they weld a smaller job. In fact, an instance comes to mind of one torch operator who welded the time regulator of a common watch, a part so small it will not weigh except on very delicate scales.

Now, as to whether the welding business is a paying one or not; ask any owner of a large expensive automobile which he would rather do: pay thirty dollars to have his cylinder block welded or pay several hundred for a new one. You can weld an ordinary break in a cylinder block in a few hours at a cost of four or five dollars. Some that are badly broken will bring sixty or seventy-five dollars. Of course, this is not the common line of work that comes to the welding shop, but a good operator can make good money eight hours a day welding pump handles and stove legs. He can weld a hundred pump handles at fifty cents a piece in a day and not work hard, either. By pump handles is meant the common run of small tinker jobs. The operator must know his business; the machine won't do the head work. And, by the way, that is one mistake the maker of welding machines often makes; he leads the purchaser, unintentionally perhaps, to believe all he needs is the machine. He should impress upon his customer that it is comparatively hard to do good welding but it is very easy to learn to do good work. The operator must learn the nature of different metals and how to handle them. Anyone with average intelligence and mechanical ability can learn to operate the welding torch. Although very few can take right hold of it and do good welding without practice.

Let us revert again to the owner of an apparatus who is in doubt about adding to his equipment: He should add to his equipment now, or soon. Why? Because there is another large field for repair work ahead. This is the tractor business. If there will be two million trucks, does it require a very great stretch of reasoning power to realize that the tractor business will be nearly as large? And the tractors will probably furnish more repair work than the trucks by reason of the kind of work they do. Could any form of work be harder on machinery than plowing? Here is something that will wear and break all kinds of castings and forgings faster than most of us realize. Nor will the farmer spare the tractor when it comes to putting in the immense acreage required to feed the war-stricken world. He will plow and till at breakneck speed day and night. The tractors will naturally wear and break under the strain. Then the farmer will want it repaired as quickly as possible. He will be in poor shape if you are not equipped to do the work immediately. Remember there is no part of a tractor you cannot repair with a welder, even scored cylinders.

Aside from this big rush of business there are other reasons why you should be fully equipped. It is foolish to weld a job with a torch too large; it wastes gas and probably makes a poor weld. And it is just as bad to weld with a torch too small for the job; it wastes time and gas, too. It is foolish, too, to have a torch clog up in the middle of a job and have to stop and clean it. Much better have several torches in the shop whereby a quick change can be made, or the correct size selected for the work to be done. In event of a torch getting damaged or broken the welder would probably lose enough money to pay for several torches by being forced to wait several weeks for a new torch to arrive from the factory. These things argue for at least two torches to each operator.

Some of you who may be rubbing along with old style welding equipment do not know that this is in many instances a loss of time and money. There are now being manufactured new designed and constructed devices and attachments that will save enough time and material to pay for themselves in a very short time considering the inadequacy of the older apparatus. It is a mistaken idea to think a torch operator can compete with up-to-date apparatus by sticking to his old-style equipment. He should know that manufacturers are continually straining to design and build better machines, more economical and less fool-proof. If he is really following up the business he should keep in touch with progress or some day he may awake to find the other fellow is taking all the cream, because he is continually trying to improve.

There is a cheap and easy way to keep up to date on what is doing in the welding world. Subscribe for a trade paper, then read it and study the things you read; look at them from the angle that applies to your particular situation. And don't neglect the advertisements; read all of them and examine the pictures contained in them. Didn't you ever pick up any useful information from reading the ads.? Hasn't it ever occurred to you that an ad. furnished just the idea you were looking for to apply to some vexing problem? Has an ad. ever furnished to you the starting hint that helped you work out a hard problem? Hasn't the cut in an advertisement ever shown to you something you wanted to know? If not, then it must be that you do not read the ads. rightly. They should be read as one would read the news items of his trade paper, for they are in reality the newsiest kind of news items. All the new discoveries, the new inventions, the new supplies, even a great many trade secrets are inserted in the advertisements. Often the mere wording and picture suggests some way of improving your own method. You will find that the fellow who gets ahead is reading the advertisements as much as any part of his paper.

Yes, the welder who succeeds must keep his mind up to date as well as his equipment. Some of them are going to find this out to their sorrow in the near future if they try unprepared to meet the coming expansion and prosperity in these United States. Now if anyone doubts that we are entering upon an era of prosperity let them investigate the municipal improvements that are being installed in all parts of the country. Visit some of the little villages out on the prairie in Kansas and see how they are paving and installing sewers, etc. When the towns of five to ten thousand population commence to pave their streets it is good sign that the country at large is prospering.

These things all point to a happy time for the repair man; in our case especially the welding machine operator. Did it ever strike you how nature balances things? The great wear and tear of machinery is balanced by the oxy-acetylene welding machine. It looks as though nature prepared in advance for the coming era of production by permitting the welding apparatus to be invented and perfected in advance.

Many farmers and residents of small towns are rapidly adopting power for the doing of many things. They grind their feed, churn their butter, pump their water, wash their clothes, and do many other things by machinery. This is another line that is enlarging by leaps and bounds. It is one worthy of careful thought. The repair welder is bound to reap a benefit from this enlarging tendency to let power do the work. Where power does the work it takes its toll in repair bills. Once more the welder is the best fitted to cope with the situation; he is the only one who can successfully repair these machines that are made of metal. And there is no danger of the individual installing his own welding apparatus on account of the time and concentration it takes to learn the business of successfully welding all kinds of metal. A tiny outfit will probably never be manufactured for home use since it would be impracticable for all kinds of general repairing. Therefore, there will always be a central welding shop.

Let us next try to refute the arguments that the welding plant is apt to stand idle a lot of the time: In the first place, there are so many different things that the plant may be used for there is no necessity for it to stand idle. These things are all aside from the usual work of repairing broken parts. The welding torch may also be used to case-harden tools and wearing parts; it may be used for melting babbitt; for burning grease off of tanks and cars; for melting caulking out of sewer pipe; for brazing and lead burning; for reclaiming defective castings in foundries; for heating castings to be shrunk on or removed from shafting; for removing boiler scale; for brazing, soldering, etc.; for manufacturing or wrecking; for opening steel safes;

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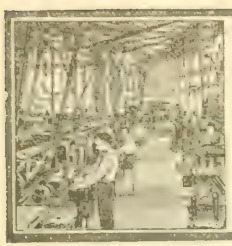
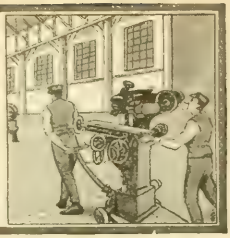
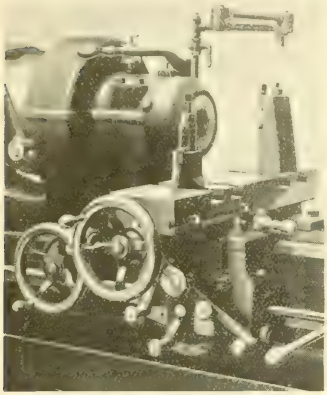


DEVELOPMENTS IN SHOP EQUIPMENT



NEW TURRET LATHE

The Warner & Swasey Company of Cleveland, Ohio, have placed on the market what is known as their No. 6 Turret Lathe equipped with double friction back gears, and with or without automatic chuck, bar feed, and



CLOSE UP VIEW OF SADDLE.

power feed to turret. Either the standard or heavy duty carriage is furnished with the machine.

Double friction back gears increase the productive ability over the single back geared machine by almost doubling the power and giving a greater speed range. With this construction nine spindle speeds are available, three for each step of the driving cone.

The power obtainable with the double friction back gears permits taking heavy forming and facing cuts on both bar and chucking jobs which are beyond the capacity of the single back geared type. When used for these heavier cuts the heavy duty carriage is preferable.

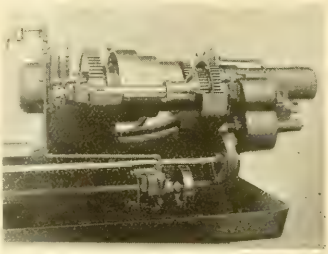
The heavy duty carriage has power cross and hand longitudinal feeds. The cross feed can also be operated by hand. Six power cross feeds and reverse are obtainable in the apron; the three finer feeds are ideal for forming, and the three coarser are suited to facing. The gears in the apron of this carriage are made of special steel and run in oil.

The cross slide is fitted with a dial graduated to .002 in. Adjustable stops are provided for either direction. The front tool post is round, has an adjustable wedge, and is arranged to be swiveled at any angle. A cutting off tool holder is regularly furnished for the rear. Either of these tool holders may be removd and forming tool holders substituted, or necking tool blocks, or any number of other tool holders, some of which are shown in the catalogue "Turret Lathe Tools."

With this heavy duty carriage on the No. 6 Turret Lathe, gear blanks, forgings, and tough alloy steels requiring heavy forming and facing cuts are handled to great advantage. Then, too, it is as easy to operate on the ordinary jobs as a machine without its reserve strength.

The standard carriage is the type that has been furnished on Warner and Swasey Turret Lathes for several years. Hand longitudinal and cross feeds are regular features of this type. Work requiring power cross feeds are best handled with the heavy duty carriage and power cross feed. Adjustable stops are provided for the cross slide. The round tool post for the front and the cutting off tool holder for the rear of the cross slide are similar to those furnished with the heavy duty carriage.

Hexagon turret is arranged for holding tools with or without shanks. The

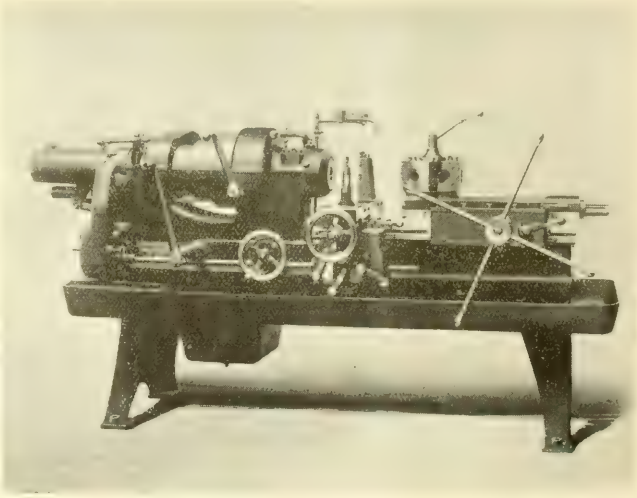


REAR VIEW SHOWING DOUBLE FRICTION BACK GEARS.

six-tool holes, counterbored for centering plate tools, are fitted with draw bolts and are bored 1¾ inches in diameter, unless ordered otherwise. Bolt holes are provided for securing plate tools to the faces.

The turret is revolved automatically by the backward movement of the slide. The locking bolt is at the front end of the slide, and works into steel taper bushings inserted in the bottom of the turret close to its outside edge, directly under the cutting tool.

Independent adjustable stops operate automatically for each position of the turret, and disengage the power feeds.



GENERAL VIEW OF THE LATHE.

They are [illegible] length of [illegible]

Turret [illegible] taper base to adjust the tool holes in turret to exact height of centre of spindle. Taper gibs, fitted the whole length of the saddle on each side, provide means for adjusting the slide sideways.

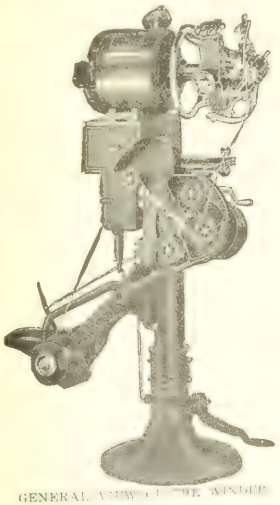
Power feed for turret slide is furnished when especially ordered. Any one of the four changes (38, 64, 107, 190) is instantly obtainable by moving a lever. The automatic trip operates in connection with independent adjustable stops for each hole in turret.

An oil pump delivers a steady and abundant flow of cutting lubricant to the cutting tools. The pump operates when the machine is run in either direction.

NEW ARMATURE WINDER

The P. E. Chapman Electrical Works, of St. Louis, Mo., announces a much more complete model of the Chapman Adjustable Bipolar Drum Armature Winding Machine, in their style 3 as shown herewith. This model in addition to being adjustable in a few minutes for any style and size of random wound bipolar drum armatures and any size of wire from No. 20 to No. 36, has some special features enabling it to wind a very great amount of wire into armature slots without pounding the wire, and also has some unique lead forming and handling features reducing the labor on this part of armature winding.

Driving motor, controller, turn counter and other necessary parts are all integral parts of the machine, in fact, the machine is complete in itself.



GENERAL VIEW OF [illegible] WINDER

A new automatic dynamometer controlled real[illegible] has been p[illegible] stops all [illegible] quick startin[illegible] sion and quick stops, so that only about five seconds are required to wind in a coil. This reel holder and tension device are simultaneously adjusted for any sizes of wire by a simple crank, and once adjusted needs no further attention until [illegible]. It is said the announcement of this device has been held back [illegible] to prove the machine a success in actual practice. In one case an output of nearly 600 per day was obtained where the estimate was 200 to 250. It is claimed that the output of the machines runs into hundreds of armatures per day on many sizes and kinds of armatures; that the saving over hand winding usually is anywhere from 10 to 30 to 1 or even better. It is claimed that the machine is easy to operate, well and strongly built; that it is useful both in the job shop and in the factory. The machine is also useful for winding field coils, smaller armature coils, etc.

W & A KEY SLOTTER

The Grob Hardware Corporation, of New York, sends us the following data regarding W & A key slotters.

In manufacturing machine or automobile parts in quantities, it very frequently happens that keyways or irregular-shaped holes are to be machined. Sometimes the proceedure is to do this work on a broaching machine or keyseater. A special broach must be made to the shape required, or if keyways are to be cut, a saw-shaped cutter-bar, the width of the keyslot. The cost of the tools alone is a serious item, which ranges anywhere from fifty to several hundreds of dollars. There is always a delay in getting these tools, sometimes several weeks, and there is also the possibility of breaking them, which means more delay and expense.

The W & A slotter will do a large volume of this work with practically no outlay for tools. Any shape can be machined, and, in many cases, in less time than a broaching machine could do it. The ordinary high-speed tool bit only is used, which is ground or formed to any shape or width. If broken, it can be replaced at a trifling expense, without delay. The slotter is instantly available for jobs within its rangs, and many thousands of parts can have the necessary machine operations performed on them and the job completed before a broach or special tool could be made.

The tilting table is a feature of great value. This allows the cutting of slots in tapered holes, the machining of all tapered work, and the rapid execution of a multitude of jobs which are within the range of neither broach nor keyseater, also entirely without the use of special tools.

In the tool-room, where a large variety of work is produced, this slotter will be found invaluable. Profiling, blanking dies, cutting clearances, filing and shaping of difficult pieces, are a few of the [illegible] and can be accomplished with economy and ease, while another important feature is that the work is in plain view at all times.

The widest keyway that can be cut at once is ¾ in. wide by 4¼ in. long in cast iron and 5-16 in. wide by 4¼ in. long in machine steel. A keyway of these dimensions can be cut in about one minute, either straight or tapered. The maximum stroke of the ram being 4½ in. Provision is made on all machines for attaching drive pulleys and countershaft. This will make a complete individual unit with three speeds, at small additional expense.

ELECTRIC WATER HEATER

The Bridgeport Machine & Tool Mfg. Co., Inc., of Bridgeport, Conn., have recently placed on the market an electric heater which can be used for the heating of water in factories, etc.

This device claims the following features: Clean, sanitary, and sterilized hot water, boiling hot if you desire, instantaneously, then natural cold water

BRIDGEPORT WATER HEATER

through the same faucet. A double valve faucet does not allow the cold water to pass over a red-hot resistance element. The same device will operate on either alternating or direct current.

To install, first remove the ordinary faucet and mount the Geyser. It is equipped to take standard ½-inch pipe. The name plate designates the voltage and amperage, which is all that is necessary to ascertain the proper size wire to be used for connecting direct from the meter to our device.

The two voltages supplied are their

110 Volt	60 Amp.
220 Volt	30 Amp.

but they can supply any voltage desired.

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PRINCIPAL CONTENTS

Afraid to Let Go

WHAT is going to happen when the United States comes to the point when it must hand back the railroads of the republic to their owners?

That day is being postponed as far as possible. Every time it looms up as a sudden possibility some person comes along and shoves it a little farther into the future.

There is a peculiar proposition to be smoothed out in those same railroads. They are losing money, and it looks as though they were going to continue to lose money. The Government officials, when they had charge of the road, brought in the McAdoo award, which has put on a burden which only the very strongest and most fit can think of handling.

Supposing the private companies got those roads again to-morrow? What would they do with them? They would first of all have to start on the process of making them pay their way.

A Government road does not have to pay in order to exist. When a deficit occurs it has been shown that the easiest way out is to call on the Government for a grant and for an order increasing freight or passenger rates, or both.

Such practices may be all right for a short time under very unusual circumstances, but a continuation of them is the making of a catastrophe.

If the roads of United States were unconditionally handed back to the owners, and the owners were to start at once trying to make both ends meet, there would be trouble right straight off, and it might be serious enough trouble.

The trouble with too many Government departments, both in United States and Canada, is that they do not get a dollar's worth of value for a dollar spent. A private company has got to get its money's worth for money paid out, or something pretty close to it. If it does not, then there is bound to be trouble.

It begins to look as though the U. S. Government were afraid to let the owners of the roads come in and put the axe to the pile of multiplying expenditures that have been banked up against the earnings of the companies.

The Changing Mechanical Field

THE field of mechanical operations is changing in Canada. Perhaps the change can be noticed more quickly in United States, but it is coming here, and in a very marked form. The manufacture of automobiles may furnish the illustration for the case in point.

Take, for instance, the manner of treating cylinder blocks. Machines are in operation that bore out eight holes at once, where before it would have meant that a boring mill would have to have been employed to do the eight holes, one at a time.

Then there is another machine that at one operation will drill 47 holes at one time in the cylinder block. Previously this would have been done on an ordinary drill press, and the forty-seven holes would have been drilled one at a time.

Take the tapping of cylinder blocks. Here are two giant machines, twins you might call them, operating on 38 holes, 14 on one machine and 24 on the other. The machines are connected by a set of rails. A special jig slides on this rail from one machine to the other. This, in former days, would have been done by a tapping chuck, or farther back still, by hand, one at a time.

These operations are mentioned here simply to show that industry is changing rapidly to keep pace with the developments peculiar to the age.

Shop practice that was considered good enough a few years ago is now out of the question. It is a case of quantity production, and it opens one of the greatest fields possible for the mechanic who wishes to apply himself seriously to the problems that are confronting the shops that are working on such output as automobiles and parts thereof.

This refers not only to the design of machine tools, but to small tools to accompany them

It is a great study, and the chances are great in proportion.

But Times Have Changed

IN them there days what's went and gone and never to return; them days, my son, for which we sigh, for which we groan and yearn—we used to take a basket, then, around the Christmas time, and kick up quite a rumpus on two nickels and a dime.

We'd wander toward the market then, in homespun garb, my dear; with woollen socks upon our feet and wool tab on the ear.

We'd buy a turkey in them days—it did not strain our purse, nor yet did cause us to bust out in words that smelt of curse. We wandered through the grocery store, ah, yes, we did, by heck! Of currants and raisins and such truck, we bought 'em by the peck.

The gatherin' up of trinkets, too, it was a simple thing—we were not buyin' in them days as though for some fat king—in simple taste we sallied out and ere we went a block, we'd got for dad, in grey and red, a brand new Christmas sock.

But folks don't turn to them things now like what we used to do—the chance for gettin' past that way is mighty thin and few. For Christmas now we've got to go and dig down in our jeans, and peel from off our shrivelled wad the last few greasy beans.

We've got to give a motor bus, a gold watch or a farm —yes, scat you simple, woolly things what's weaved in braid and yarn.

Perhaps it's best that things should be just as they is to-day, as long as folks has got the cash to spill about that way—but I can't help just hankerin' back to them there days what's sped, when folks at Christmas time of year kept steady in the head. When we could saunter forth at ease around this buyin' time, and make a reg'lar rumpus on two nickels and a dime.—ARK.

The Tunnel Will Be Built

For [illegible] of the day when the [illegible] between England and France. The world in general has not been much interested, probably because the world in general never thinks.

But work is going to start—start from both sides, the French and English Governments to find an equal share of the money and provide an equal share of the men.

Then it will be possible to take a train at London for Constantinople, for any European capital. Through the tunnel the line will be run by electric power. This will prevent trouble with engine fumes, which was one of the serious objections to the long tunnel through the Alps.

Forty-five minutes will be occupied in going through the Channel tunnel. Passengers, in fact, will pass through the tunnel almost without realizing they are passing under stormy Straits.

The tunnel will be about thirty miles long. It will not be exactly in a straight line. Beginning at a spot two or three miles on the island side of Dover, it will follow the gray chalk bed of the Channel, which is impervious to water and suitable for tunnel construction, and come out at a point between Calais and Boulogne, near the village of Marquise.

There will be, as on the London underground railways, two distinct tubes. Below them, about nine feet in diameter, will be a drainage tunnel. The whole work will take five years to complete and will employ 1,200 men on each side.

The French, who are proud of their share in the tunnel, will do half the work and find half the money. There is bound to be much friendly rivalry between the two sections of workers as to which will go ahead the faster.

According to exact calculations of the engineers, the French and British workers, who will begin construction of the tunnel thirty miles apart, will meet within an inch or two of the centre of the tunnel.

Doing Things Well

A GLANCE over the list of things for which merit and demerit marks are given on the C.P.R. system makes it clear that strict attention to business is insisted upon by this great company.

For instance, merit marks are given for these reasons:

Engineer—Detected broken rail, while in charge of passenger train and arranged to have same protected and replaced.

Engineer, fireman, brakeman—Discovered broken angle bars in track and took prompt action to have same repaired.

Section Foreman—Noticed brake beam down on coal car, on passing train, signalled train to stop and assisted in removing load.

Trainman—Discovered two broken arch bars on freight train.

Trainman—For taking prompt action when he noticed sparks falling on oil house roof, and preventing roof catching fire, resulting in no damage being done.

Demerit marks come from failure to attend to business. Little things, perhaps. Caused no train wrecks. Lost no lives, but made it harder to give good service.

The C.P.R. is claimed to be 90 per cent. efficient in operation. It attends to details. It takes little or nothing for granted. It refuses to "take a chance."

What is good for the C.P.R. may be good for you, or for your concern. Make it your business to do things well.

POLITICIANS are keen to get a glimpse of the next Premier. But there's many a manufacturer who would much rather get a squint at the man who can deliver him a car of steel in sizes and shapes that he wants.

Let Up On Machine Shops

By DONALD HAMPSON

Just as every summer there appears a long list of drowning accidents, so does every summer and fall bring its quota of killed and maimed from farming machinery. Manufacturers who have been compelled by law to guard every possible and impossible point of danger in their plants, and have been heckled to the limit of endurance by officious inspectors and insurance men view with amazement the appalling disasters that are allowed to continue on the farm without interference. It is a fact that every issue of country newspapers during the season mentioned contains at least one account of fingers or hands cut off in ensilage choppers, legs cut off in mowing machines, men suffocated or burned to death in silos, fingers lost in unprotected "cogs" of gasoline-driven machinery, and so forth through a really frightful list of accidents made worse because the victims are usually alone and miles from skilled attendance.

There was a time when machine shops were considered somewhat dangerous and the mighty hand of law was laid upon them never to be removed. However, this is all changed, and machine shop men and industrials generally feel that they are getting too much law while law is calmly "swallowing the camel" of the other fellow. Machine shop accidents to-day are of minor nature and almost never serious—the maimed workman is almost impossible to find. The writer knows of one shop of ninety men that has four among the number who are maimed to a greater or lesser degree (from lost fingers to lost feet) and every one of these four was injured on the farm. Any one of these accidents, and they are typical, would have made a great deal of trouble for the management had they occurred in the shop and would have cost from a hundred to ten thousand dollars through adjustments following, but the farm owner can proceed unmolested and his injured employee can learn to use a knife with his left hand, the only comfort (?) to be gained is that often the owner himself is the victim. Viewed from every standpoint, the shop men are justified in asking for no more regulations until the laws go after the really dangerous occupation of farming.

Aside from the features just detailed, mechanical men cannot help but wonder at the lack of guards on the products of manufacturers of farming machinery. Designers of every other class of machinery make guards and locks and safeties an integral part of the product, finding that it adds almost nothing to the cost while frequently it makes for increased efficiency and output. The farm machinery business forms too large a portion of the metal-working industry to continue in the useless sacrifice of life and limb.

AND now they are advocating an eight-hour day for farmers. When we was young we used to have the eight-hour day on the farm—one before dinner and another after.

TORONTO City Council failed to order compulsory vaccination. What else could be expected? With elections only a few weeks off who'd vote for a man who made him get scratched?

MARKET DEVELOPMENTS

Prices Going Up for New Machine Tools

Several Notices of Advances Have Been Received by Dealers This Week—Exchange Rate Also Helps to Make it Quite a Lift for the Canadian Buyer

PITTSBURGH despatches take some delight in stating that the steel strike has been broken, and the coal strike called off. That is good news, no doubt, but other Pittsburgh despatches, based on a knowledge of the steel industry, state plainly that it will probably be well on in March before a normal production can be expected from the steel mills. It all means that the Canadian industrial world will have to go easy—very easy in spots—in order to make the available steel spread over the scarce period. It also means that prices are going to be more than firm—they are going to be supplemented by a premium list which is already very much in evidence. It is hardly worth while publishing a list for jobbers just now because prices are only quoted against specific demand. Many jobbers have nothing to quote on in plate, sheets, tubes, etc., so a price list is unnecessary in their establishment.

When will the top come to the machine tool market? Just this week many Toronto dealers were notified of advances averaging around ten per cent. on standard lines. But they claim that it does not affect the sales, as the price is not nearly such an item as the ability to produce the machine. The exchange rate, duty and war tax now brings the price of a machine made in United States to an easy fifty per cent. advance over the price the American manufacturer has to pay. However, prices of machine tools are based largely on the figures prevailing at the time of delivery, and as deliveries are pretty well off into the future now the exchange rate may have righted itself before many more deliveries are made.

There is an acute shortage of cast iron scrap in the country at present, and no indications are in sight that any relief is forthcoming. This material generally comes from breaking down old plants or replacing old with new machinery. Otherwise the scrap market, especially brass and copper, is uninteresting and dull.

MONTREAL PORT HAS NOW BEEN CLOSED UP FOR WINTER SEASON

Special to CANADIAN MACHINERY.

MONTREAL, Que., December 18.—The closing of the port has virtually put the winter garment on Montreal, and especially in the vicinity of the harbor the decrease of activity is quite pronounced. Business generally has taken on a quieter tone, and this is particularly evident in many of the smaller metal working plants, where active operations are falling off. Dealers in steel lines intimate that business is still jogging along, with poor delivery still the factor of present trading. It is believed that some time will elapse before normal operations will be resumed. Coal supplies are uncertain and all parties are urged to exercise conservative policies. Machine tool movement is regulated by delivery from the States, and buyers are showing reluctance to purchase under existing conditions when adverse exchange is an important factor.

Scrap conditions are improving, but buying is not pronounced.

Slow Improvements in Steel

Despite the fact that the coal strike has ended and that recent restrictions on coal consumption has been partially removed, the situation as regards supply for industrial purposes is still sufficiently serious as to demand every precaution in the use of fuel, as the immediate supply is not ample to meet the full requirements of normal activity. The conservative burning of soft coal is almost as essential to-day as it was before the recent conference, and it will be some weeks yet before depleted piles can be replenished from the re-worked areas. The local situation is not causing undue concern, but all recognize the urgent necessity of reasonable conservation of supplies on hand. Many of the steel plants that were forced to close during the past week or two, in the States, are again active, and resumption of normal operations will, no doubt, be reflected here in the better delivery of ordered material, a condition that has been none too good for some time back. Dealers here are anticipating a quiet period until after the New Year, when some active buying is expected. The conviction that prices now ruling are likely to abide for a considerable period is firmly impressed upon the minds of most manufacturers and consumers, and early developments in the way of deferred industrial enterprise is not unlikely early in the New Year. In many lines of steel commodities the prices quoted are more as a guide than the actual figures at which sales are made, and when existing conditions are seriously considered it will be readily understood that present sales are invariably made on the merits of each individual transaction. Dealers here state that the prices quoted are a fair average of those generally figuring in current sales.

Strength Developing in Metals

There is a firmer tone ruling in the non-ferrous market, due to the more settled condition following the return to work of the coal miners. The demand has not shown any heavy increase, but the inquiry shows a more optimistic spirit on the part of consumers. The financial condition at present is the chief factor affecting business, particularly where purchases are made in the States. Dealers report a fair business in ingot metals but state that sheet movement is still restricted owing to the inability of obtaining sufficient to meet the trade requirements. Little galvanized material is carried in stock.

Quotations are unchanged, but a firm-

ness ... strong ... steel ... coal ... motor ... but ... develo... would ... looking ... the st... report ... ditions ... reflected in an early upward revision of prices. Local dealers, however, are not looking for any great activity before the close of ... ties ... at this time of the year.

ADVANCES MADE IN THE SELLING PRICES

TORONTO.—There is practically no change in the machinery and steel market this week. Dealers in all lines are still figuring on what can be done to bring deliveries up to something that will keep pace with the requirements that are being placed upon the trade.

The exchange rate is not helping the sale of tools that are brought in here from across the line, but dealers are not certain that their business is suffering at all in consequence.

In some lines there is, generally, a little falling off during the season immediately around Christmas, but there is no reason to suppose that the same influence will not operate this year, although it is not much in evidence yet.

More Advances Made

In several instances this week, CANADIAN MACHINERY was informed that advices had been received of advances to the selling prices of several lines. One well-known firm making shapers, automatics, milling machines, etc., notified their agent of a five per cent. advance on December 8, while in another case the head of one Toronto machinery concern stated that the mail he was opening had brought in several notices of ten per cent. advances.

"Does that affect the volume of busines... you ... ?" asked CANADIAN MACHINERY.

"Not that we notice,' was the reply. "The big thing just now is being able to get the machine wanted at all. The biggest bother is in getting in touch at once with all the outstanding quotations, notifying them that the figures that had been furnished to them have since been withdrawn. There is more annoyance from this than anything else, as we often have customers who imagine we should be able to get in and place their business at the price that has just been withdrawn. The exchange rate, while it is high, does not bother us much, as it makes a difference of only five per cent. above the price that has been paid all along. There is something ... must consider ... that selling prices of machine tools are based on the price at delivery, and not on present figures. Many of the best makers in the United States are sold out for four or five months to come, and by the time that has gone the exchange rate may have done much to right itself, so for the present there is no use of us worrying about it."

Should Plan Farther Ahead

Here's the opinion of one machine tool dealer, who has had a splendid chance to size up the situation as he finds it in the Canadian market: "Canadian manufacturers are fine fellows to do business with, but I am stating a plain and very apparent truth when I say that they do not plan far enough ahead. That is what is causing much of the congestion of orders at the present time. The average order that is placed in Canada looks like a piece of emergency business. You could almost imagine, at times, that the war was going to start all over again. It does not seem to be the practice to look ahead, make out their programme, and let the machinery dealers have a chance to get the business away to their principals in something like decent time."

The Small Tools

Some nice orders have been placed for supplies during the week. As stated last week, there is still some pretty close trimming being done in the matter of prices. One representative told CANADIAN MACHINERY this week that he had passed up a nice-sized order because he refused to meet a price that had been placed on the business. This same dealer was also of the opinion that the Canadian makers were holding their own in this market, despite other reports. Many of the dealers, outside of the special recognized representatives of the companies, are complaining of the lack of protection they receive from the makers. The makers of drills, etc., in Canada, sell at the same price to the trade as they will to the jobber. Dealers handling a number of lines feel that they must carry all these drills, etc., and in order to do so must make a profit on them. So, in some cases, they carry the lines, figure out their costs and selling price, and adhere to these figures regardless of what may or may not be done. They have to keep up their margin of profit, so they cannnot afford to cut prices in order to secure business, even on a large scale.

Like the machine tool business, the makers of drills, cutters, and similar lines are finding a demand for special equipment to do special work in the automobile field. So it is that firms have to make a special study of the shops with this view in mind.

Little in Scrap Market

Business is not making any new records in the scrap market just now. There seems to be a mysterious "something" in the scrap market these days that looks like some real happenings when it breaks, but there is also an air of mystery surrounding it that nothing has come out.

There is a very decided shortage of cast iron all over the country. It looks as though this shortage would become acute, as nothing is in sight at the moment to remedy the situation. The bulk of this kind of scrap usually comes from the breaking up of mills, factories, and the replacement of old machinery and equipment by new.

Conditions Are Worse

It looks from here as though the premium market would be in for a merry session in the spring, as far as the selling of steel is concerned. True, the United States Steel Corporation adhere to the schedule of March 21, but it must

POINTS IN WEEK'S MARKETING NOTES

Although the steel strike and the coal strike are both declared off, production at the steel mills in the United States will hardly be raised to anything like normal before the end of March.

U.S. authorities put a limit on the price of coke following a tendency to much higher prices due to the strike. The regulations may remain for some time yet.

It is estimated that the strike in the United States steel mills caused a loss in production of 2,600,000 tons.

U.S. railroads are counted on to come into the machine tool market for large supplies as soon as they are returned to their private owners by the U. S. Government officials.

Advances are reported in several lines of machine tools. Toronto dealers were notified of many ten per cent. advances. They contend that it does not hurt selling, although with exchange added it brings the price in Canada 50 per cent above what the U.S. buyer pays.

Deliveries of steel are not improving. If there is any change in the situation it is for the worse rather than for the better.

Used machine tools are moving out very quickly owing to the fact that prompt delivery can be made, and there is also a big price difference.

There is an acute shortage of scrap iron just now, with no prospects of any relief. The coppers in the scrap line are dull and weak.

be remembered that the Corporation, large as it is, has a limit to its capacity, and also that none of the producers have much of a string on their material once it gets away from the mills.

Jobbers are trying to stock now for the spring rush, and they are finding that the work is hard and almost impossible. Any dealer that can get the ear of a mill just now, and secure a promise of a delivery at a date within reason at all, is lucky beyond words. Some of the rollers, according to reports, are not at all anxious to book up very far in advance, as they look for better business on ahead, and want to be in a position to get in on this when it comes.

Canadian mills are booked well in advance, so far, in fact, that there have been cases where orders for a very nice tonnage of sheets has gone begging for the reason that none of the mills cared to take it on. Booking is still going on at the Canadian mills, and they are making a very good performance in the matter of turning out the material.

NEW YORK MACHINE TOOL MARKET SHOWS A TENDENCY TO GO UPWARD

Special to CANADIAN MACHINERY.

NEW YORK, Dec. 18.—Not only has machine-tool business continued to hold up well, despite the restrictions put upon industry because of the coal situation, but the outlook for next year appears particularly encouraging. Many companies are known to be figuring on lists of tools to be bought early in 1920. The automotive industries bulk largely in present business and future prospects, but there are indications that next year the railroads will figure quite extensively in machine tool purchases. It is known that once the roads are returned to their owners, and a program of rehabilitation is inaugurated, large purchases of metal-working machinery will follow.

One of the interesting developments of the week is the issuance of a list of about 200 miscellaneous tools by the Wright Aeronautical Corporation, a new concern, which, in a measure, succeeds to the Wright-Martin Aircraft Corporation, though the assets of the latter were recently absorbed by the International Motor Co., of Plainfield, N. J. The Wright Aeronautical Corporation will build airplane engines, and possibly also Simplex automobiles. It will have a plant at New Brunswick, N.J., and possibly another one at Long Island City, N.Y.

Some Large Buyers

Other companies engaged in automotive lines are buying, or figuring on, extensive purchases. The Stevens-Duryea Co., Chicopee, Mass., has let a contract for a plant addition, and has already bought a few machine tools, with more purchases to come soon. Production of the Stevens-Duryea automobile will be resumed as soon as the plant can be tooled up. The Willys Corporation, Elizabeth, N.J., continues to place orders against its very large requirements, and the New Departure Mfg. Co., Bristol, Conn., a unit of the General Motors Corporation, has placed additional large orders in the past week. Several companies engaged in making lighting and starting systems, magnetos, spark plugs, etc., for automobiles, are figuring on buying tools early in 1920.

The American Locomotive Co., New York, is planning on the expenditure of several million dollars on plant expansion, and this will include some new work at the Montreal plant. New equipment, costing $500,000 or more, will also be purchased, some of the company's requirements now being before the trade for quotations.

The Farrel Foundry & Machine Co., Ansonia, Conn., which has purchased the Victory plant of the Fore River Shipbuilding Co. at Buffalo, has issued a list of about 70 tools, including large planers, boring mills, lathes, slotters, etc.

Prices on machine tools show an advancing tendency, some lines having been advanced from 5 to 10 per cent. within the past two weeks.

MAY BE MARCH BEFORE FULL PRODUCTION OF STEEL IS REACHED

Special to CANADIAN MACHINERY.

PITTSBURGH, Dec. 18.—An intense feeling of relief pervades the iron and steel industry. The coal strike is off, and probably carries with it what little was left of the iron and steel strike. What remains to be done is to complete the organization of working forces for efficient operations. Full output may not be reached until March, but steady progress is expected to be made. The steel trade feels as if it would be leaving behind it, with the old year, most of its troubles.

With one dissenting vote, the committee of the United Mine Workers, sitting at Indianapolis, on December 10, voted to accept President Wilson's proposal of 14 per cent. wage advance, any remaining grievances to be submitted to a commission of three to be appointed by the President and to report, if possible, within 60 days. Miners then began straggling back to work, and this week there is moderately-full operation of the union mines. Coal production by the non-union fields and a few union mines, had reached a rate about 50 per cent. of the rate in the four weeks ended Oct. 25, a period of very heavy production. Much coal was then being mined for stocking purposes, and thus there should be sufficient coal from now on, even though absolutely full operation at the union mines is not attained. Transportation will probably be the limiting factor. The railroads will make a special effort to expedite the production and movement of coal, but some of the commandeered coal had been moved far afield, and it will require some time to get all the empties back to their regular regions.

Most of the regulations as to the consumption of coal were removed by an order issued Dec. 12. They applied to the consumption of electric current in stores and office buildings. The regulation as to factories operating only three days a week was misunderstood in some quarters. It did not limit a factory that had coal, but prescribed that the distributing authorities would not furnish coal for more than a three-days' operation, and there was no guarantee that as much as that would be furnished.

Saturday, Dec. 13, the regulation as to consumption of coal in coke making was removed. As to beehive, the first restriction was 25 per cent., this being increased at the beginning of last week to 50 per cent.; but it required a little time to put the regulation into operation. Estimates are that last week's Connellsville coke production was 60 per cent. of that of the preceding week, which had shown a sharp increase over immediately preceding weeks, in the case of furnace ovens, but no increase in the case of merchant ovens. The by-product ovens were to be furnished no more than enough coal for a 50 per cent. operation, ovens being required to work on not less than 30 hours' coking time. This week the beehive ovens are operating as fully as labor conditions permit, while the by-product ovens will require some time to get into full operation again, as their coal must be shipped.

Pig Iron Production

Monday, Dec. 8, war-time price limits were placed on coke, these being $6 for furnace and $7 for foundry, in the case of Connellsville. Previously, there had been a scramble for spot lots, sending prices above $10. Some furnaces accumulated reserves, but a few had to bank; and this week a few more may have to bank, as it requires from one to two weeks for coke to reach destination. However, the restriction in pig iron production is not very serious. On the whole, the merchant furnaces have had to curtail more than the steel works furnaces.

The price limits will probably remain on coke until the end of the month,

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of the coke operators neglect their
spot
market, whereby some furnaces would simply be buying their own coke at a premium.

Steel Production

The coal strike can hardly have made steel scarcer, though there are no visible signs of it having made steel more plentiful. On the whole, the shortage of coal restricted the consumption of steel more than its production. A number of steel mills have been affected, but the finishing of steel has been restricted more than the production, through some works keeping their open-hearth furnaces, or Bessemer converters, going when they closed rolling departments to save coal, and the unfinished steel accumulated can be rolled later.

The Iron and Steel Strike

Before the coal strike began to restrict steel mill operations, the iron and steel strike was practically over, except in the Wheeling districts. Strikers in that district have been making investigations as to operations elsewhere, and find that the strike leaders grossly misled them by insisting that operations were poor in other districts. The Wheeling district strikers are, therefore, ready to go back to work, and plants in the district will be started as rapidly as fuel supplies permit.

While the strike is over, the steel producers explain that it will be some time before full production can be reached, as working forces are badly demoralized on account of so many men having shifted in employment, while the morale is low at some works through the men taking advantage of the knowledge that the employers preferred them to be on the payroll and doing indifferent work rather than to be on strike. The situation is probably not as bad as it is painted in some quarters, however, for it must be remembered that in August the production of steel, although greatly increased over the rate in May, was only about 80 per cent. of rated capacity, and in the first three weeks of September, just before the strike, it can hardly have been as much as 85 per cent. Thus the mills have no high mark to aim at in order to regain the rate of production before the strike.

It is now possible to make a fairly close estimate of the amount of steel production lost on account of the iron and steel strike [illegible] tion, September 22, until December 8, when the coal situation became altogether the dominant influence, there was a period of 11 weeks. The rate of finished rolled steel production just before the strik[illegible] gross tons a week. [illegible] production [illegible] tons. Actual production may be estimated at about 4,000,000 tons, showing an apparent deficit of 2,600,000 tons. However, part of the production before the strike, perhaps 10 per cent. or more, was for the purpose of accumulating stocks, since the strike was expected, and in many quarters even a greater strike than occurred. Production for consumption was only between 500,000 and 550,000 tons, and stocks were drawn upon during the strike. The severest shortage was observed after the strike had been in progress eight or ten weeks, when production had greatly increased, because stocks were then largely exhausted. A 600,000-ton rate of production may not be reached before February or March, but if capacity operations are reached, the rate of production should be close to 725,000 tons a week. If labor shortage prevents full operation of steel mills, presumably the consumers of steel will likewise be affected by labor shortage.

Pig iron prices continue to show an advancing tendency, but only a slight one now, and possibly the buying movement is over.

SCOTIA CONTROLS ACADIA COMPANY

Purchase of Shares That Had Been Formerly Held by Belgian Interests

Halifax.—D. H. McDougall, president of the Nova Scotia Steel & Coal, is pleased with the results of the visit abroad of officials of that company. Prospects of export trade, especially in heavy forgings, axles and other finished products of the New Glasgow plants, were very encouraging, the Scotia company having formed most valuable connections in the British Isles and on the Continent.

In Belgium extensive and important business is now under negotiation, and the same may be said with regard to other European countries.

The high cost and scarcity of ships at the present time are delaying the closing sales of large quantities of ore that the Wabana mines are capable of producing, but the British and Continental steel manufacturers have a very high opinion of the quality of Scotia's iron ore and rapidly increasing and remunerative business in this direction will be finally closed when the shipping situation becomes clearer.

Gets Control of Acadia

On the other side the Scotia officials finalized the purchase of the Belgian interests of the Acadia Coal Company. This gives Scotia the control of very extensive and valuable coal areas in Pictou County which had been held in Belgium since 1910. The acquisition of these properties by the Scotia company means the rounding off of Scotia's holdings on the mainland, and in addition to greatly adding to the scale of the company's present operations it will eventually result in a much greater development of the properties of the two companies. Asked as to the rumors of the merger of the steel companies of Eastern Canada, Mr. McDougall said there was absolutely no change in this respect as far as Scotia was concerned. The company's connections on the other side, together with its already established business in Canada, places Scotia in a position to carry on very satisfactorily on its own account.

RAILROADS MAKE USE OF MOVIE BUSINESS

Teach Safety Ideas by Entertaining Methods—December Session of Railway Club

The advantages of motion pictures as an industrial educator were amply illustrated at the December meeting of the Canadian Railway Club, held in the Windsor Hotel, Montreal. One of the pictures shown was on "The House That Jack Built," the film used by the "Safety First" department of Canadian National Railways for the instruction of the employees in guarding against possible accidents incidental to the daily life of the railroad worker. Before the picture was thrown on the screen a preliminary talk was given by E. E. Stevens, of Moncton, N.B., safety engineer of the C.N.R.

The second picture depicted was what might be termed "Safety Second Movement" of industrial warfare. This film consisted of two reels taken by the St. John's Ambulance Association, for demonstrating in a pleasing and instructive manner the proper methods of treating a variety of injuries sustained by persons in the course of their daily domestic or industrial duties. The work of the St. John's Ambulance Association has been invaluable in the saving of life and limb, and a brief history of the origin and development of this universal first aid work was given in a very comprehensive talk by Col. R. J. Birdwhistle.

It was decided at the meeting that the annual dinner of the Canadian Railway Club would be held again this year, and a committee has been formed to arrange the necessary details for a banquet, which will take place about the end of January.

John Stewart, of Paris, Ont., died at Brantford recently. He was a resident of Paris for forty years and conducted a foundry in that city. He was born at Galt and has been living in Paris during the last four years following a stroke which incapacitated him. He is survived by three daughters.

Civil Service Appointments.—The following appointments are announced by the Civil Service Commission: Commander Bernard Leitch Johnson, D.S.O., Vancouver, to be superintendent of pilots for B.C., with headquarters at Victoria. John Milford Wyatt, juvenile employment specialist for the Department of Labor; Ralph Hoppinh, San Francisco, entomologist for the Department of Agriculture for B.C.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	$33 00
Lake Superior, charcoal, Chicago	38 40
Standard low phos., Philadelphia	40 00-40 00
Bessemer, Pittsburgh	35 00
Basic, Valley furnace	30 00
Toronto price:—	
Silicon..2.25% to 2.75%	$37.00 to $40.00

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	$ 4 25
Steel bars, base, Toronto	4 25
Steel bars, 2 in. to 4 in. base	5 50
Steel bars, 4 in. and larger base	6 00
Iron bars, base, Montreal	3 75
Steel bars, base, Montreal	3 75
Reinforcing bars, base	4 50
Steel hoops	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	4 40
Chequered floor plate, 3-16 in.	7 50
Chequered floor plate, ¼ in.	7 00
Staybolt iron	8 00
Bessemer rails, heavy, at mill	....
Steel bars, Pittsburgh	2 35
Tank plates, Pittsburgh	2 65
Structural shapes, Pittsburgh	2 45
Steel hoops, Pittsburgh	3 05
F.O.B., Toronto Warehouse	
Small sapes	4 25
F.O.B. Chicago Warehouse	
Steel bars	3 62
Structural shapes	3 72
Plates	3 90
Small shapes under 3"	3 62

FREIGHT RATES

	Per 100 Pounds. C.L.	L.C.L.
Pittsburgh to Following Points		
Montreal	33	45
St. John, N.B.	41½	55
Halifax	49	64½
Toronto	27	39
Guelph	27	39
London	27	39
Windsor	27	39
Winnipeg	89½	135

METALS

	Gross.	
Lake copper	$24 25	$24 00
Electro copper	24 00	24 00
Castings, copper	23 50	24 00
Tin	57 50	60 00
Spelter	10 00	10 75
Lead	8 25	8 75
Antimony	10 50	10 50
Aluminum	33 00	35 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, ½ up	$ 5 00	$ 5 00
Plates, 3-16 in.	5 25	5 25

Price List No. 38

WROUGHT PIPES
Standard Buttweld

⅛ in.	$ 6 00	$ 8 00
¼ in.	4 68	6 81
⅜ in.	4 68	6 81
½ in.	6 21	7 78
¾ in.	7 82	9 95
1 in.	11 56	14 71
1¼ in.	15 64	19 90
1½ in.	18 70	23 76
2 in.	25 16	32 01
2½ in.	40 37	51 19
3 in.	52 79	66 94
3½ in.	67 16	84 18
4 in.	79 57	99 74

Standard Lapweld

2 in.	38 81	35 34
2½ in.	42 12	52 36
3 in.	55 08	68 47
3½ in.	69 00	86 94
4 in.	81 75	103 00
4½ in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces

WROUGHT NIPPLES

4" and under, 60%.
4½" and larger 50%.
4" and under, running thread, 30%.
Standard couplings, 4" and under, 40%, 4½" and larger, 20%.

OLD MATERIAL

Dealers' Average Buying Prices.

	Per 100 Pounds. Montreal	Toronto
Copper, light	$14 00	13 75
Copper, crucible	17 00	17 00
Copper, heavy	17 00	17 00
Copper wire	17 00	17 00
No. 1 machine composition	15 25	16 00
New brass cuttings	11 00	10 75
Red brass cuttings	14 00	14 75
Yellow brass turnings	8 00	9 00
Light brass	6 25	7 00
Medium brass	7 25	7 75
Scrap zinc	6 00	6 00
Heavy lead	5 00	6 00
Tea lead	3 75	3 50
Aluminum	18 00	18 00
	Per Ton	Gross
Heavy melting steel	13 50	16 00
Boiler plate	13 50	11 00
Axles (wrought iron)	20 00	20 00
Rails (scrap)	14 50	16 00
Malleable scrap	18 00	20 00
No. 1 machine cast iron	24 00	25 00
Pipe, wrought	9 00	9 00
Car wheels	20 00	20 00
Steel axles	20 00	20 00
Mach. shop turnings	7 00	11 00
Stove plate	22 00	21 00
Cast boring	10 00	11 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ⅜" and less	15
Carriage bolts, 7-16 and up	Net
Coach and lag screws	30
Stove bolts	50
Wrought washers	50
Elevator bolts	5
Machine bolts, 7-16 and over	10
Machine bolts, ⅜" and less	20
Blank bolts	25
Bolt ends	10
Machine screws, fl. and rd. hd., steel	27½
Machine screws, o. and fil. hd., steel	10
Machine screws, fl. and rd. hd., brass	net
Machine screws, o. and fil. hd., brass	net
Nuts, square blank	add $1.50
Nuts, square, tapped	add 1 75
Nuts, hex., blank	add 1 75
Nuts, hex., tapped	add 2 00
Copper rivets and burrs, list less	15
Burrs only, list plus	25
Iron rivets and burrs	40 and 5
Boiler rivets, base ¾" and larger	$8 50
Structural rivets, as above	8 40
Wood screws, O. & R., bright	75
Wood screws, flat, bright	77½
Wood screws, flat, brass	55
Wood screws, O. & R., brass	55½
Wood screws, flat, bronze	50
Wood screws, O. & R., bronze	47½

MILLED PRODUCTS

(Prices on unbroken packages)

	Per Cent.
Set screws	40
Sq. and Hex. Head Cap Screws	35
Rd. and Fil. Head Cap Screws	5
Flat But. Hd. Cap Screws	10
Fin. and Semi-fin. nuts up to 1 in.	35
Fin. and Semi-fin. nuts, over 1 in., up to 1½ in.	25
Fin. and Semi-fin. nuts over 1½ in., up to 2 in.	10
Studs	15
Taper pins	40
Coupling bolts	Net
Planer head bolts, without fillet, list	10
Planer head bolts, with fillet, list plus 10 and	net
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	net
Collar screws	list plus 20, 30
Thumb screws	40
Thumb nuts	75
Patch bolts	add 20
Cold pressed nuts to 1½ in.	add $1 00
Cold pressed nuts over 1½ in.	add 2 00

BILLETS

	Per gross ton
Bessemer billets	$43 00
Open-hearth billets	43 00
O.H. sheet bars	46 00
Forging billets	56 00
Wire rods	55 00

Government prices.
F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	$4 95
Cut nails	5 00
Miscellaneous wire nails	60%
Spikes, ⅜ in. and larger	$7 50
Spikes, ¼ and 5-16 in.	8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10¼
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 32
British Manila rope	0 26
New Zealand hemp	0 26
Transmission rope, Manila	0 43
Cotton rope, ¼-in. and up	0 80

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net

MISCELLANEOUS

Solder, strictly	$ 0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 50
Linseed oil, raw, single bbls.	2 90
Linseed oil, boiled, single bbls.	2 92
Plaster Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	List plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	40-10-5
Standard drills, all sizes	40-10-5
3-fluted drills, plus	10
Jobbers' and letter sizes	40-10-5
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	50
Sleeves	50
Taper pin reamers	net
Drills and countersinks	5% off
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	20 to 40
Canadian high speed cutters, net to	10 off
American	plus 40

COLD ROLLED SHAFTING

At mill	list plus 5%
At warehouse	list plus 25%

Discounts off new list. Warehouse price at Montreal and Toronto

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15¾c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28	$ 6 55	$ 6 75
Sheets, black, No. 10	6 00	6 00
Canada plates, dull, 52 sheets	8 50	7 10
Can. plates, all bright.	8 50	8 00
Apollo brand, 10¾ oz. galvanized	....	....
Queen's Head, 28 B.W.G.	....	....
Fleur-de-Lis, 28 B.W.G.	....	....
Gorbal's Best, No. 28	....	....
Colborne Crown, No. 28.	....	....
Premier, No. 28 U.S.	....	8 20
Premier, 10¾ oz.	....	8 50
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

(Warehouse Price)

B

¼ in., $13.00; 5-16, $11.00; ⅜ in., $10.00; 7-16 in., $9.80; ½ in., $9.75; ⅝ in., $9.20; ¾ in., $9.30; ⅞ in., $9.50; 1 in., $9.10; Extra for B.B. Chain, $1.20; Extra for B.B.B. Chain, $1.80.

ELECTRIC WELD COIL CHAIN B.B.

⅛ in., $16.75; 3-16 in., $15.40; ¼ in., $13.00; 5-16 in., $11.00; ⅜ in., $10.00; 7-16 in., $9.80; ½ in., $9.75; ⅝ in., $9.50; ¾ in., $9.30.

Prices per 100 lbs.

FILES AND RASPS

	Per Cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	27½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50
Great Western-American	50
Kearney & Foot, Arcade	50

BOILER TUBES.

Size.	Seamless	Lapwelded
1 in.	$27 00	$.....
1¼ in.	29 00	.....
1½ in.	30 00	26 50
1¾ in.	32 00	26 50
2 in.	31 00	26 00
2¼ in.	35 00	28 00
2½ in.	43 00	32 00
3 in.	48 00	40 00
3½ in.	.....	41 00
3½ in.	60 00	42 00
4 in.	75 00	56 00

Prices per 100 ft., Montreal and Toronto

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal., bulk	24½
Palacine	24½
Machine oil, per gal.	36
Black oil, per gal.	15
Cylinder oil, Capital	58
Cylinder oil, Acme	45
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	$2 60
Union thread cutting oil, antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	8

BELTING—No 1 OAK TANNED

Extra heavy, single and double	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES

Chesterman Metallic, 50 ft.	$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES

Polishing wheels, felt	4 00
Polishing wheels, bull-neck	2 25
Emery in kegs, American	06
Pumice, ground	06
Emery glue	35
Tripoli composition	09
Crocus composition	12
Emery composition	10
Rouge, silver	50
Rouge, powder, nickel	45

Prices per lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.6

BRASS—Warehouse Price

Brass rods, base ½ in. to 1 in. rod	0 34
Brass sheets, 24 gauge and heavier, base	$0 42
Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

XXX Extra	19½	Atlas	17
Peerless	19	X Empire	15½
Grand	18	Ideal	16
Superior	18	X Press	14
X L C R	17		

Colored

Lion	15	Popular	12
Standard	13½	Keen	10½
No. 1	13½		

Wool Packing

Arrow	25	Anvil	15
Axle	20	Anchor	11

Washed Wipers

Select White	11
Dark colored	09
Mixed colored	10

This list subject to trade discount for quantity.

RUBBER BELTING

Standard ... 10% Best grades ... 15%

ANODES

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices per lb.

COPPER PRODUCTS

	Montreal	Toronto
Bars, ½ to 2 in.	$42 50	$43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6 x 4 base	45 00	44 00

LEAD SHEETS

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	$10 75	$11 50
Sheets, 3½ lbs. sq. ft.	10 50	11 00
Sheets, 4 to 6 lbs. sq. ft.	10 25	10 50

Cut sheets, ½c per lb. extra.
Cut sheets to size, 1c per lb. extra.

PLATING CHEMICALS

Acid, boracic	$ .25
Acid, yhdrochloric	.04
Acid, nitric	.10
Acid, sulphuric	.04
Ammonia, aqua	.13
Ammonium, carbonate	.20
Ammonium, chloride	.22
Ammonium hydrosulpuret	.50
Ammonium sulphate	.30
Arsenic, white	.14
Copper, carbonate, annhy	.41
Copper, sulphate	.16
Cobalt, sulphate	.20
Iron perchloride	.62
Lead acetate	.30
Nickel ammonium sulpate	.16
Nickel carbonate	.32
Nickel sulpate	.18½
Potassium carbonate	.50
Potassium sulphide (substitute)	.42
Silver chloride (per oz.)	1.25
Silver nitrate (per oz.)	1.20
Sodium bisulphate	.18
Sodium carbonate crystals	.06
Sodium cyanide, 127-130%	.38
Sodium hyposulphite per 100 lbs	8.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.30
Xinc sulphate	.08

Prices per lb. unless otherwise stated

GEOMETRIC

Adjustable Collapsing Taps

Have overcome all the expense and annoyance of tapping screw threads with a solid tap.

Anyone doing thread tapping knows what backing out a solid tap each time means. It usually means low production, poor threads, and worn out taps.

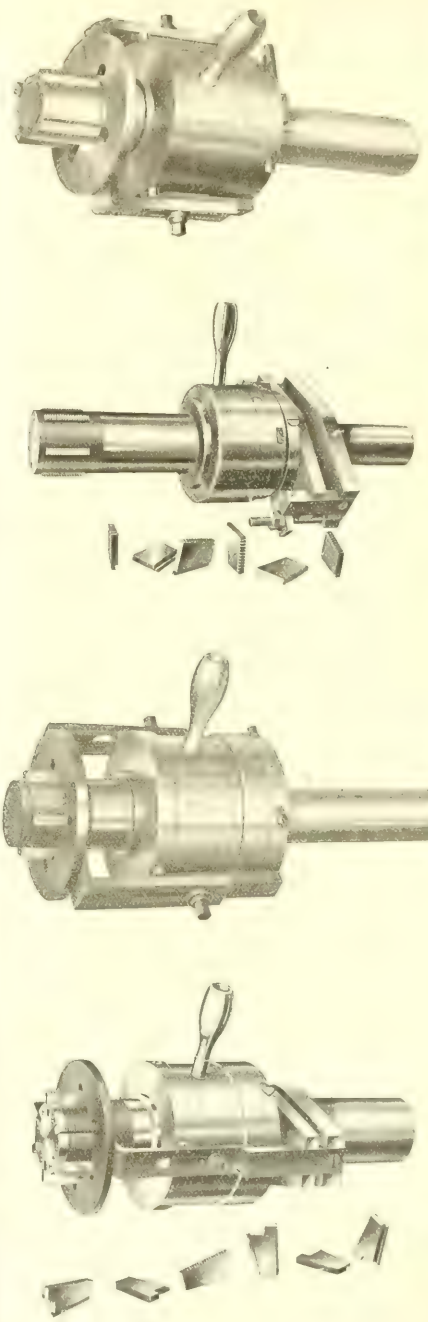
The mechanism of the Geometric Taps takes care of adjustment to correct diameter each time a thread is tapped, it collapses the chasers automatically, leaving a thread clean cut and perfect.

The chasers are readily reground, and when finally used up, are renewed at comparatively small cost, leaving the tap as efficient as when new.

The manufacturers of the Geometric line of Collapsing Taps and Self-opening Die Heads are justly proud of the distinction which is theirs:—

The Originators
and the
Largest and Best Known Manufacturers
of
Automatic Threading Tools

For cutting all classes of screw threads, internal and external, of any diameter and form.



The Geometric Tool Company

New Haven, Conn., U.S.A.

CANADIAN AGENTS:

Williams & Wilson, Ltd., Montreal, [illegible] Machinery Co., Ltd., Toronto, Winnipeg and St. John, N.B. [illegible] Brookes-Morse Co., Ltd., Manitoba, Saskatchewan [illegible]

MONTREAL NOTES

Lawrence Russell, vice-president and general manager of Armstrong, Whitworth of Canada, is on his way home from England, after a two months' business trip in the interests of the firm.

Following a recent address by T. B. Macaulay, before the Montreal Board of Trade, on the question of closer trade relationship between Canada and the West Indies, a special committee has been appointed to study the possibilities of this trade development.

The McClary Manufacturing Company will shortly erect a considerable addition to their Montreal plant, and have acquired an adjoining property for this purpose. It was stated by J. C. Newman, Montreal manager of the company, that the new building will be one of four storeys, and that construction operations will be commenced immediately.

Plans are progressing for the construction of a large modern equipped foundry at Lachine for the Dominion Bridge Co. This departure was found necessary, owing to the post-war developments of the company in regard to the manufacture of turbo machinery and paper mill equipment.

Owing to the pronounced scarcity of coal, the Canadian Trade Commission has taken steps to regulate the distribution of existing supplies, on a preferential basis. In connection with the bunkering of boats at Canadian ports, vessels under the Canadian flag will receive the first consideration. Generally speaking boats applying for coal will only be supplied with sufficient to reach their destination. It is recommended that, as far as possible, bunkering will be carried out at Sydney on account of proximity to the mines.

The closing of the port of Montreal for the winter season has transferred the shipping activities to St. John, N.B., and this latter terminal will take care of the bulk of the imports and exports of Canadian trade. In view of the growing importance of the city of St. John it has been proposed that better hotel accommodation should be furnished and to this end plans have already been prepared, and the committee in charge have recommended a structure of about 200 rooms at an estimated cost of approximately $900,000, of which $700,000 has already been raised.

Windsor.—During the operation of salving the Willis L. King, the chief officer, John T. Lillis, was killed, and James Dawson, foreman of the Great Lakes Engineering Works, Ecorse, was painfully injured. The accident was caused by the wire cable breaking away from the snatch block, while the tug was pulling on it in an effort to release the steamer from the bank.

U.S. SCRAP METAL

The pig iron market is still advancing, but is steadier than has been the case of late. In some districts, uncertainty over the coal situation has affected the market. Following are reports from various sources:—

PITTSBURGH—There has been a general advance of $1 per ton on the base grades of pig iron. Basic is selling at $34. The market is not so much on edge as it has been, but demand is good. Producers are not anxious to take much business at current prices. There is still a lot of 1920 business to close, and prices are expected to improve still more.

BOSTON.—Iron is scarce, both for prompt delivery and first half, and prices are mounting. A Massachusetts melter has bought from Eastern Pennsylvania furnace No. 2X at $37 furnace, prompt shipment. 400 tons of $3.25 to $3.75 silicon was bought for $41 Virginia furnace. Price is secondary consideration in the present state of the market.

NEW YORK.—A good deal of iron has been picked up quietly, and is being held for a rise. Basic has moved during the week at $35 Eastern Pennsylvania furnace. A Central Pennsylvania furnace is quoting $39 furnace on 1.75 to 2.25 silicon. There is not much iron available at furnaces.

Trade Notes

Restrictions on Gas Users.—The Government Gas Commissioner at Chatham has issued an order prohibiting any industry using natural gas for special manufacturing or commercial purposes without first obtaining a permit from the local gas company.

Sudbury Wants Aerodrome.—The Sudbury Board of Trade have decided to invite a representative of the Bishop-Barker Aeroplane Company to visit the city in connection with the establishment of an aerodrome for the trans-country service the company have in prospect.

Brantford Factory Has Large Output.—The Dominion Steel Products Company of Brantford turned out a total of 800,000 tons of propeller shafting during the war. This was twice as much as Canada's total tonnage for the year of 1918. One shaft was built for the United States destroyer Reid.

Coal Embargo Still On.—The restriction on coal which have been removed in the United States are still in force in Caanda. The embargo on coal coming across the border is still in force. This was announced following a meeting of the Dominion and Provincial fuel controllers, subsequent to the settling of the U.S. coal strike. There is still the danger of a serious car shortage developing, which would be as bad in its way as the non-production of coal at the mines.

PIG IRON TRADE

The market for old material is firm. In most districts demand is good, with rising prices in some cases. Following are reports from U.S. points:—

PHILADELPHIA. — There is a fair demand for most grades of scrap, and the tendency is for prices to advance. The fuel situation is acting as a check but should be discounted by now. Heavy melting is quoted at $25, delivered.

BOSTON.—All grades are in demand and selling higher. No. 1 machinery has sold at $36, and heavy melting at $18. 400 tons of No. 1 cast was sold at $34.50. Heavy cast brings $28 to $28.50.

NEW YORK.—The general trend of prices is upwards, in spite of one or two exceptions. Cast borings have dropped $1, now quoted $16.50 to $17 f.o.b. New York. Heavy melting is now $18.50 to $19 f.o.b. New York, an advance of 50 cents. Machinery cast has gone up $2, and is now $27 to $28 f.o.b. New York.

PITTSBURGH—The market is strong. Dealers are not inclined to make any sacrifices, on account of the threatened curtailment by the mills. Heavy melting is at $25, delivered. Other grades are strong, except bundled and baled sheets.

INCORPORATIONS

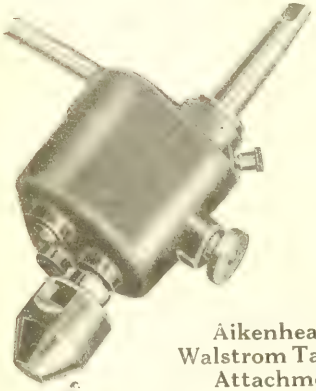
The Dominion Engineering & Machinery Company, Ltd., with a capital stock of $3,000,000, and with head offices at Montreal, heads the list of incorporations in this week's "Canada Gazette." Other companies are: United Amusements, Ltd., Montreal, $1,000,000; Peterborough Paper Box Company, Peterborough, $50,000; Super-Cement (America) Co., Ltd., Toronto, $500,000; Manatee Lands, Ltd., Montreal, $150,000; Scientific Experimenter, Ltd., Montreal, $100,000; Olswang Leather Specialty Co. of Canada, Ltd., Montreal, $20,000; Canada Drugs, Ltd., Yorkton, Sask., $50,000; Winans, Dickinson & Whitehead, Ltd., Montreal, $200,000.

Kingston.—The barge Cadorus, owned by the Sincennes-McNaughton line, sank in lock 21 of the Morrisburg Canal. The stern section of the Great Lakes liner Northland is blocked, owing to the accident. The Sincennes McNaughton Company will commence wrecking operations at once.

Montreal.—Plans for the harbor works at Vancouver have been authorized, and Mr. A. D. Swan, consulting engineer, has been instructed to proceed immediately with the work. The work will cost $5,000,000, and tenders will be called for within six or eight weeks. The Vancouver Harbor Commissioners have been studying harbor facilities at Montreal, Quebec and New York.

Aikenhead's Tools

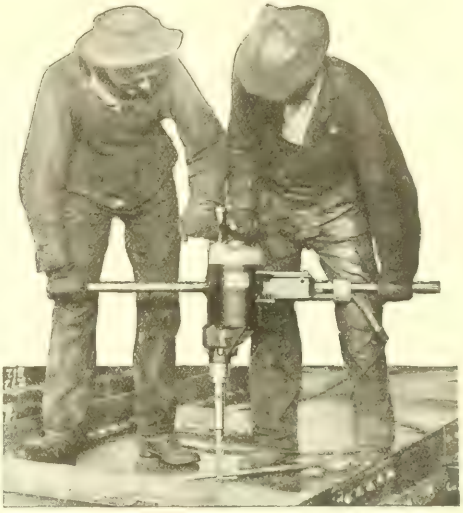
Dependable in Quality and Service



Aikenhead's Walstrom Tapping Attachment

The oscillating movement mechanically imitates hand-tapping, though 10 times faster, and reduces tap breakage to the very minimum.

Attached to any drill press will quickly pay its cost.



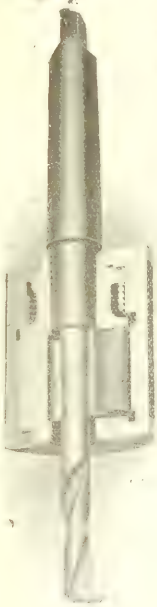
Aikenhead's VanDorn Electric Portable Drills

Van Dorn Electric Drills make neat, clean holes 50% faster than the best pneumatic drills.

Van Dorn Drills are both fool-proof and trouble-proof. ASK THE USER.

Aikenhead's Stillson Wrench

The nose of the head always grips when wanted. A [illegible] are [illegible]



Aikenhead's Walstrom Chuck

[illegible] the taper on the cutting [illegible]

[illegible] Slippage is impossible.

Aikenhead's Bull-Dog Die Stocks

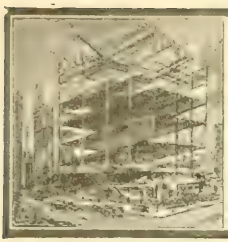
[illegible] in two seconds without stopping spindle. [illegible] No [illegible]

Write for full particulars and prices re any line or lines in which you are interested

Aikenhead Hardware, Limited

17 Temperance Street - Toronto, Ont.

[illegible] and place with letters to be answered



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS
PERSONAL AND TRADE NOTES

PECKOVER'S, LIMITED, TO ERECT BIG WAREHOUSE AT FOOT OF SPADINA AVE.

ANNOUNCEMENT is made of the formation of a new warehousing, jobbing and importing company in Toronto under the name of Peckover's, Limited. Work is being rushed on temporary premises at the foot of Market street, the firm's address being for the present 67 Esplanade. They have been fortunate in mill deliveries, for already over a thousand tons are on the way in the line of bars, steel and iron, alloys, nickel steel, tool steel, sheets, plates, galvanized, tubes, etc.

J. G. NEAR.
General Manager, Peckover's Ltd

The new premises, which will be ready as soon as possible in 1920, give Peckover's, Limited, a splendid site of three acres at the foot of Spadina Ave. at the corner of Fleet street. Besides a splendid dock, they are on three lines, the C.P.R., G.T.R., and C.N.R. In this way they can get water delivery from Algoma, Hamilton, or the mills in Nova Scotia, and are close to the rails for [illegible] ment.

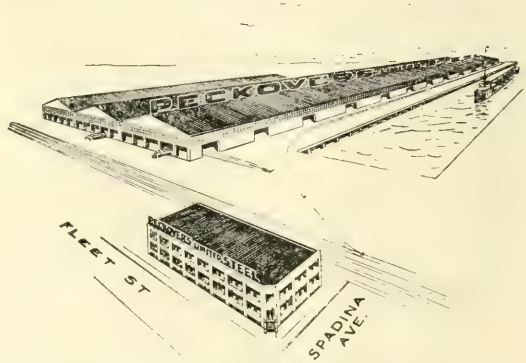
The principals in the new company are C. M. Peckover, of the firm Baines & Peckover, and J. G. Near, for the past 18 years with the Drummond-McCall Co., of Montreal and Toronto.

Mr. C. M. Peckover has been in the [illegible] in Canada for a long time. He first started at the study of steel in Scranton, coming to Canada about 23 years ago to the Rice Lewis Co., but remaining with them for only a year. It was then that he went into business with Mr. Baines as agents for the London Rolling Mills and for the London Bolt and Hinge Works. The firm of Baines & Peckover developed to large proportions, Mr. Peckover enjoying the confidence of a large clientele on account of his intimate knowledge of the steel business. Mr. Peckover has been a traveller as well as a successful steel merchant, but his travelling has very often had a touch of business. For instance, he has visited nearly all the large steel mills of America and Europe, and also most of the best conducted warehouses, looking for information and ideas.

J. G. Near is a Toronto boy, going from school to the Drummond-McCall business some 18 years ago. Mr. Near had much to do with the development of the Drummond-McCall warehouse department, having charge of that work for some years, and latterly in charge of all sales. He is well known to the industrial interests of Ontario particularly. A few years ago Mr. Near was better known as a runner, winning the Ward Marathon in Toronto (20 miles) in 1909. He also ran well up toward the front in the Boston Marathon, and was third man when the Hamilton Herald road-race was bringing out a string of contestants from all over the country each year. Mr. Near becomes the general manager and secretary of Peckover's, Limited.

The new warehouse at the Spadina avenue property will be a model one in every particular, with overhead electric crane installations for moving material. The main building will be 200 feet wide by 600 feet long, while the offices of the company will be across the tracks, on Fleet street. Several changes will be made from the ordinary warehousing practices in Canada. Sheared plate is bought now in practically every case, but Peckover's, Limited, will cut to any size desired, in plate, shapes and structurals. Plate also will advance six inches at a time, instead of a foot, which is now the general practice.

As far as CANADIAN MACHINERY can learn, Peckover's, Limited, was brought into existence at this particular time on account of a fairly well-founded rumor that a large American concern was coming in here to conduct a waterfront warehouse on similar lines. The new firm is capitalized at half a million dollars, with $300,000 paid-up capital.



PROPOSED WAREHOUSE, OFFICE, AND DOCK OF PECKOVER'S LTD AT FOOT OF SPADINA AVE.

TRADE GOSSIP

[illegible] the P. H. Secord Construction Company [illegible] already been commenced.

New Toronto Factories. — There are some [illegible] connection with Toronto's industries. The Willard Chocolate Company are going to erect a large factory on the corner of Manning Avenue and Dupont Street, for manufacturing ice cream, the cost to be about $140,000. The Ward Baking Company, of New York, will erect a bakery on the north-west corner of the same streets, and on the north side of Dupont Street the Kinnear Wholesale Grocery Company will erect a $150,000 warehouse.

Hope for Settlement Soon. — The conciliation board enquiring into the Nova Scotia coal strike, held its first sitting recently, and following it, an official of the U.M.W. stated that there were good hopes of an early settlement. Mr. H. J. McCann, assistant to Mr. Mark Workman, signified his willingness to meet the men's representatives, and the latter said in reply that they had always been anxious to discuss their differences, and would be pleased to accept the offer of a further conference.

Fuel for Foundries. — According to Mr. Harrington the 150 cars of soft coal that have been held at the U.S. border have been ordered released by the Federal authorities. There is, therefore, no further fear that Canadian foundries will have to close down for lack of coal. Coke will, likewise, be allowed to come freely into Canada. Mr. Harrington also said that unless the utmost conservation was observed in office and large buildings, he would be forced to issue an order limiting the temperature, and enforce heatless days.

Going to Sarnia?—Lake Huron Steel Corporation plans are now centred in Sarnia, according to latest reports from that centre, and a deal is understood to be in process of completion for the acquiring of 1,184 acres along the St. Clair River front from the Sarnia Indians for $200,000. The property in question adjoins the tract purchased some time ago by the Wills Lee Automobile Corporation of Sarnia and Port Huron. It is the [illegible] of the Steel Company officials [illegible] in the event of a $15,000,000 [illegible] Many [illegible] whose names have been associated with the enterprise are S. A. Howland, Detroit [illegible] Imperial [illegible] the [illegible] m[illegible]

CHANGES MADE IN INGERSOLL FIRM

Ingersoll.—An important announcement pertaining to changes affecting several local industries has been made. It is of special interest to citizens in view of the fact that the annual payroll is one million dollars, which will necessarily be a big factor in continuing the substantial progress which this town has been making.

E. A. Wilson of the Ingersoll Machine Co., Ltd., has joined with the John Morrow Screw & Nut Co., Ltd., and will be vice-president and joint manager with J. A. Coulter, the head of the Morrow Co. for many years. It also has been announced that the Morrow Co. has purchased an interest in the Ingersoll Machine Co., Ltd., and the American Machine Products Co., Incorporated, of Detroit, and will, with Mr. Wilson and Mr. Munger, formerly of this town, operate them, together with the Ingersoll File Co., as subsidiary companies to the John Morrow Screw & Nut Co., Ltd.

At the plant of the Ingersoll Machine Co some $50,000 worth of new machinery is being installed to make a line of tools not previously made here.

Col. F. H. Deacon, of Toronto, honorary president and director of the board, will devote as much time as possible to the development of the industries here.

MARINE

Kingston—The Canadian Beaver was launched from the yard of the Collingwood Shipbuilding Company at Kingston, being christened by Mrs. J. B. Foote, wife of Capt. J. B. Foote, of Toronto. The vessel is a full canal-sized freighter for the Canadian Government Merchant Marine. She is 251 feet long, and of 3,500 tons deadweight.

The Chairman of the Board of Control, Toronto, will receive tenders up till February 10th, 1920, for the supply and installation of one or more 16 to 20 million imperial gallon centrifugal pumps at the waterworks main pumping station. Specifications and forms of tender can be obtained at the Works Department, Room 12, City Hall.

Hamilton.—The steamer "Floretta," which was the first boat to steam through Hamilton harbor at the opening of navigation this season, has been refloated from the shoals of Kelly Harbor. She was stranded there through the receding of the water caused by the heavy wind of a few days ago. She has been in continuous service all season, and has steamed a total of 2,360 miles.

Halifax.—The "Royal George," fitted with an amplifier on her wireless apparatus of the same type that has been heretofore only supplied to warships, has broken a record for wireless telegraphy on merchant ships. She received a message from England when only a few miles off Halifax, this being the first time a merchant vessel has received a message clear across the Atlantic. The "Royal George" is the first merchant vessel to be fitted with an amplifier.

Montreal.—The Elder-Dempster liner "Bassa," which went ashore while clearing harbor on her voyage to South Africa, has been successfully refloated. She was taken into Vickers' floating dry dock for examination and repair, if found necessary. Before she could be floated it was necessary to lighten her of a large part of her cargo, and required the united efforts of a harbor tug and the Government steamer "Strathcona" to dislodge her.

Montreal.—Admiral Jellicoe does not believe that surface ships will be entirely supplanted by submarine and aerial types in the near future. Speaking before the Canadian Club in Montreal, he said he had every respect for the enthusiasm of aircraft and submarine officers, and no doubt it was very tempting to those who held the purse-strings to say "Let's spend no more on the navy." He thought the fact of the Admiralty being about to sell the "Indomitable" was because she was out-of-date.

London.—Owing to the frequency of losses due to floating mines the marine underwriters have been compelled to raise their rates. The rate is now about one-half of one per cent., against one-eighth of one per cent. a few weeks ago. The rates were dropped after a rather long period in which losses were low, but they have been gradually increasing. After the Russo-Japanese war, losses from mines were encountered as long as eighteen months from the conclusion of hostilities.

NEW CATALOGUE

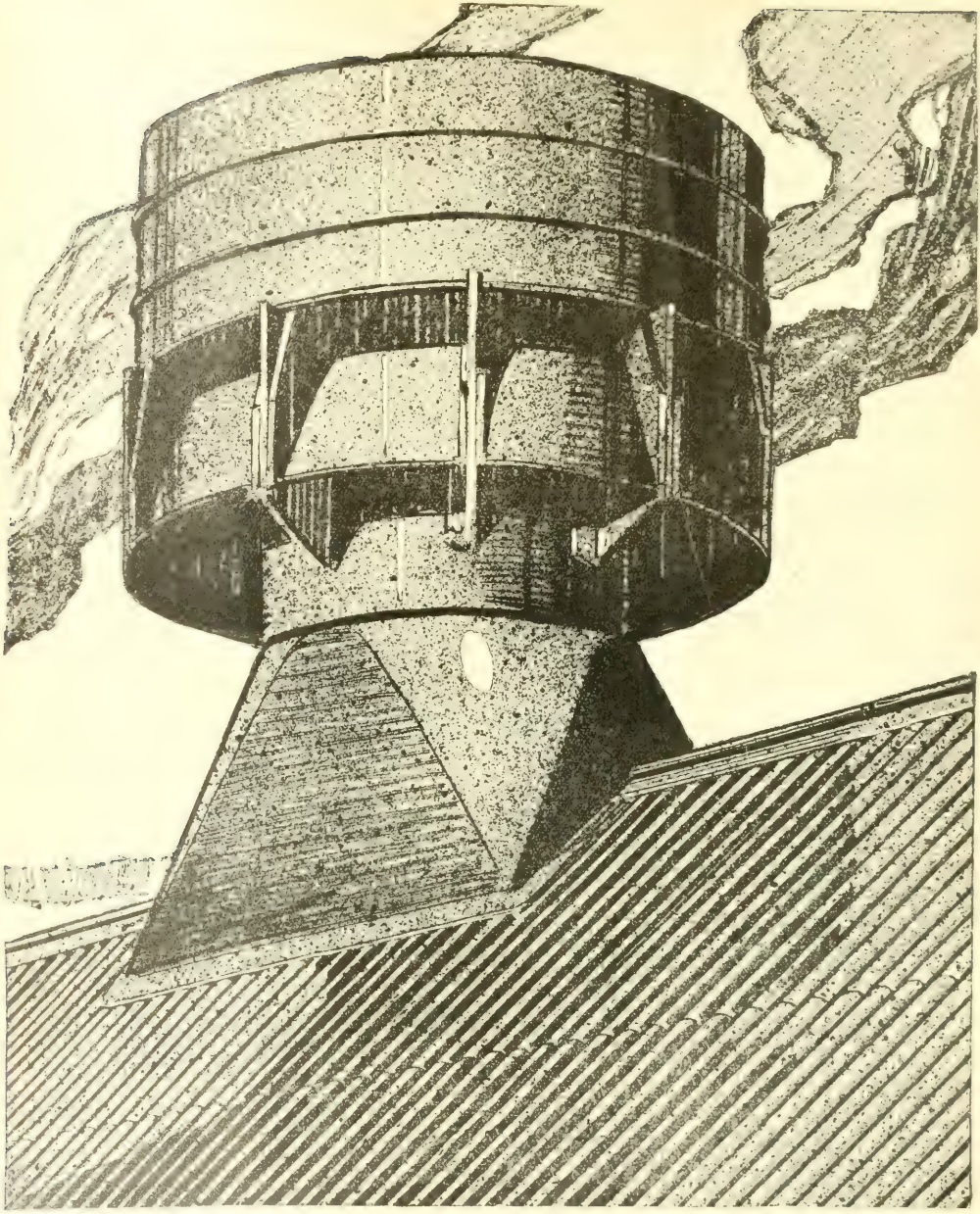
The Clark Equipment Co., Buchanan, Mich., have issued a very attractive catalogue illustrating their well-known line of Celfor drills, reamers, lathe tools, etc. Their complete line is described in this useful book. A general information section is placed at the back, containing telegraph codes, feeds and speeds, morse taper shanks, decimal equivalents, and other useful data. This is known as their catalogue No. 17.

TOOL HOLDER CATALOGUE

A catalogue of unusual style has reached us from Jones & Shipman, Leicester, England. This booklet illustrates various style tool holders, both English and American design, but shows, in almost natural color, the finish on these holders. Lathe dogs, sockets, tool drifts, and centre drills, gauges and chucks, are also included in the catalogue.

LOOSE LEAF CATALOGUE

The Smith & Mills Co., of Cincinnati, Ohio, have recently issued an attractive loose leaf catalogue on their lines of pillar shapers, showing various size machines, also attachments for the same. Shaper vises are also included in this catalogue.



PROCESS HIGHWAY MATERIALS

Trade Mark Reg. U. S. Pat. Off.

If interested tear out this page and place with letters to be answered.

CLASSIFIED ADVERTISING SECTION

Rates (payable in advance): Two cents per word first insertion; one cent per word subsequent insertions. Count five words when box number is required. Each figure counts as one word. Minimum order $1.00. Display rates on application.

HELP WANTED

AGENTS WANTED THROUGHOUT DOMINion for Cowan Transveyors. Address R. B. Smiley, 120 Glenholme Ave., Toronto, Ont.

MONTREAL SUPPLY HOUSE HAVING SALES organization and good connections with mills and industrial plants in Quebec and Maritime Provinces (branch St. John, N.B.), is open to handle one or two more specialties of merit, chemical or mechanical. Address Box 642, Canadian Machinery. (c25m)

POSITIONS WANTED

POSITION WANTED BY A FIRST-CLASS mechanic with a large experience in making gauges, dies, jigs and fixtures for small work, and small tools; can take charge of department. Know how to handle screws; have been working in some of the best shops in the U.S. Is an inventor, also improver and designer. Aged 50 years; good health; steady worker. In answering please mention the class of work and mention the highest wages, with all particulars. A position wanted for his son, also a first-class mechanic. Apply during the week of November 15th. L.E.J., 38 Gleneig Street W., Lindsay, Ont. (c26m)

MACHINERY WANTED

WANTED—ONE ONLY HIGH-SPEED RIVETer. Shuster preferred, capable of riveting ¼ inch. Toronto Lock Mfg. Co., Toronto, Ont.

FOR SALE

FOR SALE—BRAND NEW INGERSOLL-RAND After-cooler, never used, for compressor up to 14 x 14". London Mfg. & Machine Co., Ltd., London, Ont. (etfm)

FOR SALE — WATSON-STILLMAN HYDRAUlic Press, complete with four-plunger automatic variable belt pump. A. G. Crawford, 14 Mail Bldg., Toronto, Ont.

AGENCIES WANTED

CANADIAN AGENT WANTED TO HANDLE line of Black Diamonds, Diamond Tools, etc. Address Box 643, Canadian Machinery. (etfm)

MACHINE WORK WANTED

MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H Sumbling Machinery Co., Toronto. (etfm)

PATTERNS

TORONTO PATTERN WORKS, 65 JARVIS Street, Toronto. Patterns in wood and metal for all kinds of machinery. (cfm)

BRANTFORD PATTERN WORKS ARE PREpared to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell 'Phone 631; Machine 'Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (etfm)

Mechanician Wanted

WANTED — First-class fitter (engine), preferably ex-R.A.F. warrant officer or N.C.O., who has been employed in an Engine Repair Park, or man with extensive shop experience. Excellent prospects for right man. Call or write

Major Jackson
MacLean Publishing Co.
153 University Ave.
Toronto

WHEN WRITING TO ADVERTISERS, KINDLY MENTION THIS PAPER

THE "WANT" AD.

The "want ad." has grown from a little used force in business life into one of the great necessities of the present day.

Business men nowadays turn to the "want ad." as a matter of course for a hundred small services.

The "want ad." gets work for workers and workers for work.

It gets clerks for employers and finds employers for clerks. It brings together buyer and seller, and enables them to do business though they may be thousands of miles apart.

The "want ad." is the great force in the small affairs and incidents of daily life.

SAY YOU SAW IT IN CANADIAN MACHINERY

Full line of
Honestly Rebuilt Machine Tools at bargain prices.
Special price on 20 inch x 8 ft. C.M.C. Lathe.
STANDARD EQUIPMENT & TOOL WORKS
179 St. James St. - MONTREAL

Manufacturers desirous of selling in Great Britain are asked to give particulars to

Furniss Clarke & Co.
Room 63
364 University St., Montreal

NOW!

You've been going to send in that ad for weeks, so why not mail it now for next week's issue.

Canadian Machinery
143-153 University Ave., Toronto

SURPLUS EQUIPMENT FOR SALE

PRESSES

	Stroke	Width Between Uprights	Approx. Cap. Tons
2—No. 666 Toledo Embossing Presses	2	32	1,200
2—No. 27 Bliss Embossing Presses	2	32	1,000
2—No. 87 Bliss Crank Presses, double back geared	16	37	250
2—No. 60½ Bliss Rack and Pinion Drawing Presses	60	21	100
10—No. 60½ Bliss Rack and Pinion Drawing Presses	42	21	100
1—No. 857 Toledo Rack and Pinion Drawing Press	48	25	100
1—Robertson Hydraulic Press with pump and extra set of columns	24	27	800

LATHES

7—11″ Blount Speed Lathes, 5′ bed.
1—18″ Hamilton Lathe, 6′ bed.
1—19″ Greaves & Clushman Lathe, 8′ bed.
2—18″ Davis Lathe, 6′ bed.
1—15″ Carroll Jamieson Lathe, 6′ bed.
1—16″ Davis Lathe, 6′ bed with Turret.
1—16″ Hamilton Lathe, 6′ bed.
5—16″ Blount Speed Lathes, 6′ bed.
4—No. 2 Warner & Swasey Speed Lathes.
2—20″ Stoll Wood Turning Lathes.
35—Bullard Cartridge Case Lathes.

GRINDERS

2—Wells Cutter Grinders.
1—12″ x 72″ No. 4 Cincinnati Universal Grinder.
1—No. 70 Heald Internal Grinder.
1 No. 75 Heald Internal Grinder.
1—10″ x 24″ Landis Grinder.
1—No. 1 American Surface Grinder.
1—No. 74 La Salle Surface Grinder.
1 Ford-Smith Double Head Grinder, 3″ x 24″ wheel.

FURNACES

1—Gas Muffle Furnace, 3¼ x 1½″ x 7″ long.
1—Gas Tempering Furnace with oil reservoir.
1—Gas Tempering Furnace with Tray in Reservoir.
1—H.S. Tool Hardening Furnace, 9″ x 8″ x 9″ long.
1—Double Door Gas Furnace, Doors 20½″ x 12″ high. Fire Space 50″ wide, 12″ high, 54″ long.
1—Gas Furnace for Annealing Scrap Brass.
5—26 ft. Rockwell Single Chamber Annealing Furnaces, equipped with Electric Pyrometers and Recording Instruments, Oil and Gas Burners, Air Rams and Pullers.
1—16 ft. Rockwell Single Chamber Annealing Furnace equipped with Electric Pyrometers and Recording Instruments, Oil and Gas Burners, Air Rams and Pullers.
3—Conveyor Type Annealing Furnaces. Could be used for annealing automobile pistons or other similar work.

BLOWERS AND FANS

	Size of Outlet		Displacement per rev.
1—Root Positive Blower	8″	Vertical	3.3 cu. ft.
2—Connersville Positive Blower	8″	″	3.3 ″ ″
2 ″ ″ ″	6″	″	1.5 ″ ″
1 ″ ″ ″	6″	Horizontal	1.5 ″ ″
1 ″ ″ ″	8″	″	1.5 ″ ″
1—No. 4 Sheldon Blower	9″	″	
2 No. 4 ″ ″	9″	Vertical	
1 No. 4 Sturtevant ″	10″	Horizontal	
1—Boland Positive Blower	4	″	
3—Desk Fans.			

MOTORS

10 to 75 H.P., 25 and 60 cycle, 220 Volt., 3-phase.

MISCELLANEOUS

DRILLS

1 -3 Spindle Variable Speed Drill. C. G. Allan Co., Barrie, Mass.

SHEARS

1 No. 1 Gray's Sheet Metal Cutter.
1 No. 1 Quickwork Rotary Shear.

HACKSAWS

1—No. 3 Atkins Power Hacksaw.

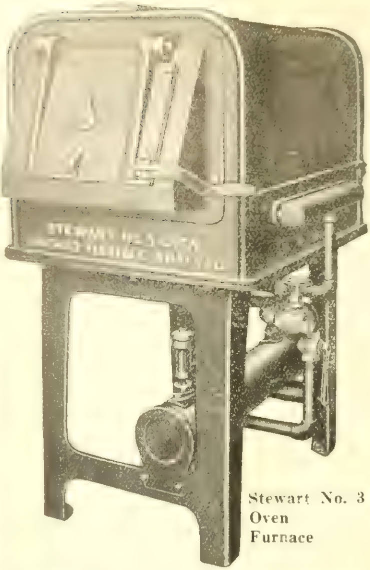
MILLING MACHINES

1 No. 1 Standard Hand Miller.
11—No. 3 Brown-Boggs Trimming Machines.
1 -No. 066 Deming Gear Oil Pump, Belt Drive.
2 -Franklin Portable Cranes.
12—Cowan Elevating Trucks.
2 -20-lb. Cap. Scales Drams Graduation on Beam.
1 Two-Ton Platform Scale.
1 -Five-Ton " "
2 -½-Ton " "
2 -1,200-lb. " "
1 -Tinius Olsen Testing Machine, 10,000 lbs. capacity, hand-operated.
1 -No. 1 Brinell Hydraulic Testing Machine.
1 -Sauveur-Boylston Photo-Micrographic Instrument.
23—4″ Curtis Air Hoists.
2—5″ " " "
1—6″ " " "
26—I-Beams for Curtis Air Hoists.
1 -Boland Special Sand Blast Machine.
1 -No. 2X Garvin Vertical Tapping Machine.
1 -Whitton Centering Machine.
Dodge Wood Split Pulleys.
Cast Iron Split Pulleys.
Shafting, and Hangers.
1 -Model "M" Richardson Force Feed Oil Pump.
3 -No. 310 Simplex Lifting Jacks.
4 -2½″ x 18″ Screw Jacks.
1 -2¼″ x 16″ " "
3 -1¼″ x 4″ " "
1 -No. 873 Toledo Trimming Machine.
Bristol & Brown Indicating Pyromters.
" " Recording "
3 -Shore Scleroscopes.
1 -C. E. Wright Metal Cutting Handsaw, 30″ Wheels.
1--No. 35 Demagnetizer Style, 115 D.C., Amps. 1.5, Volts 115. Made by D. & W. Fuse Co., Providence, R.I.
5 -Heads Suitable for Polishing Brushes, 1¾″ Hole in chuck, 1″ spindle.
1 -Bench Tapping Machine, takes up to ⅜″ tap. Burke Machine Company, Conneaut, Ohio.
1 -Carboy of Cement Hardening, 5 Gals.
1 -Thor 1—1/16″ x 4″ serial D.R.H. Air Hammer.
1 -Ingersoll Rand, size 1 S, symbol 1 SM Air Hammer.
1 -Ford Car Starter.
2 -Automatic Receivers for Boiler House Feed Pumps.
1 -Tank, 30″ dia. x 48″ long, suitable for Compressed Air.
1 Tank, 24″ dia. x 60″ " " " " "
1 Tank, 36″ dia. x 72″ " " " " "
1 -Open Galv. Iron Tank, 5 ft. high x 3 ft. dia. with 1″ faucet.
4 -¼″ Thick Iron Open Tanks, 4 ft. long, 2 ft. wide x 1 ft. 8 in. deep with 2 in. drain.
1 -Motor-driven addressograph machine with stencil cutting machine and full equipment of special attachments.
2 Adding Machines (Listing)

CANADIAN CARTRIDGE COMPANY, LIMITED

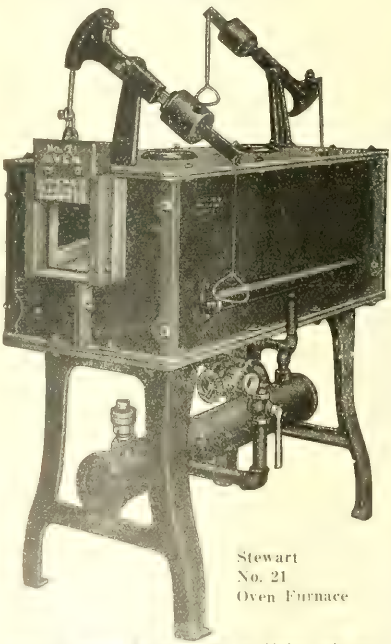
HAMILTON, CANADA

Mention this page and place with letters to be answered.



Stewart No. 3 Oven Furnace

For Annealing, Tool Hardening and Carbonizing in small boxes.
Opening, 9" x 15". Depth, 24".
Floor Space, 36" x 48".
Gas and air connections, $1\frac{1}{2}$".
Shipping weight, 1900 lbs.



Stewart No. 21 Oven Furnace

[illegible] for [illegible] work, as blades, rods, etc.
Depth, 12 [illegible]

Take No Chances

You Can't Afford to Spoil Material or Risk Tool Breakages.

MODERN industrial plants invest too much in costly material and high-priced labor to risk spoiled work or expensive breakages of machine parts or tools. Many tool breakages are directly due to improper hardening. It is often almost impossible to replace at once special tools or parts, making necessary the holding up of a machine and the entire progress of production.

Stewart Furnaces for proper industrial heat treatment are absolutely dependable in production results. No spoiled material—no imperfectly hardened tools or machine parts. You can trust your most exacting work to a Stewart and *know* that it will meet the requirements.

Stewart Furnaces are *built right*. Thorough knowledge of metallurgy and modern shop practice means practical, scientific design. High grade materials, skilled workmen, and efficient supervision make for sturdy, dependable construction that will stand up day after day. Convenient, economic fuel consumption, with just the right placement of heat, and temperature always under positive control, result in uniform, high quality production.

We will help you solve your heat treating problems. Our new catalog, No. 75, is yours for the asking.

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Use Common Sense

Real Hack Saw Economy requires the use of common sense in the regulation of weight on the saw.

Every machinist knows, when he is using a hand hack saw, that as the blade becomes worn, more pressure must be put upon it if the cutting speed is to be maintained, but he's very apt to overlook that point in using power machines.

As the saw is used the teeth become worn, and what we call the "contact" area, the area of the blade that actually rests on the work, becomes greater. That means friction and a necessity for more pressure to make the blunted teeth cut into the work. On a heavy saw 64 pounds pressure is generally about the right figure to start with, but to keep the saw cutting as fast, after it has made twenty odd cuts as it did at first. more pressure-weight is needed.

The Starrett Hack Saw Chart "3" helps every user of Hack Saws to do more work at a lower cost. Copy sent you free upon request. Write for Catalog No. 21 "3"

THE L. S. STARRETT CO.

The World's Greatest Toolmakers
Manufacturers of Hack Saws Unexcelled

ATHOL, MASSACHUSETTS
NEW YORK LONDON CHICAGO

Starrett Hack Saws

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If ... name and place with letters to be answered.

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If what you want is not here, write us, and we will tell you where to get it. Let us suggest that you consult also the advertisers' index facing the inside back cover, after having secured advertisers' names from this directory. The information you desire may be found in the advertising pages. This department is maintained for the benefit and convenience of our readers. The insertion of our advertisers' names under proper headings is gladly undertaken, but does not become part of an advertising contract.

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See Compressors

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MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

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Hamilton Co., Wm., Peterboro.
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CASTINGS, NICHROME
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CASTINGS, STEEL CHROME AND MANGANESE STEEL
Thos. Davidson Mfg. Co., Montreal, Que.
Dom. Foundries & Steel, Hamilton, Ont.
Hull Iron & Steel Foundries, Ltd., Hull.
Kennedy & Sons, Ltd, Owen Sound.

CASTINGS, MALLEABLE
International Malleable Iron Co., Guelph

CASTINGS, NICKEL STEEL
Hull Iron & Steel Foundries, Ltd., Hull.

CEMENT, IRON
Warmington, & Co., J. N., Montreal, P.Q.

CEMENT, ELASTIC JOINTING
Warmington & Co., J. N., Montreal, P.Q.

CEMENT MACHINERY
Can. Fairbanks-Morse Co., Ltd., Montreal.
Gardiner, Robt., & Son, Montreal.

CEMENT HANDLING MACHINERY
Can. Link-Belt Co., Toronto, Ont.

CENTERING MACHINES
Victoria Foundry Co., Ottawa, Ont.

CENTRE REAMERS
Bertram & Sons Co., John, Dundas.
Butterfield & Co., Inc., Rock Island, Que
Gardner, Robt. & Son, Montreal.
Hartford Special Mch. Co., South Sudbury, Mass.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Hartford, Conn.
Wells Bros. Co., of Canada, Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

CHAIN, WELDED COIL
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

CHAIN BLOCKS
Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Ltd., Montreal
Ford Chain Block & Mfg. Co., Phila., Pa.
Garlock-Walker Machy. Co., Toronto.
Morris Crane & HoistCo., Herbert, Niagara Falls, Ont.
Rice Lewis & Son, Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que.
Jones & Glassco, Montreal, Que.

CHAINS, AGRICULTURAL
Morse Chain Co., Ithaca, New York.

CHAINS, AUTOMOBILE ENGINE
Morse Chain Co., Ithaca, New York.

CHAINS, BICYCLE, DRIVE AND BLOCK
Morse Chain Co., Ithaca, N.Y.

CHAINS, FOR ELEVATORS AND CONVEYORS
Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson, Ltd., Montreal, Que

CHAIN, MALLEABLE, DETACHABLE AND RIVETED
Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

CHAINS, POWER TRANSMISSION
Morse Chain Co., Ithaca, New York.
Glascow, N.S.

CHAINS, SPROCKET WHEEL
Morse Chain Co., Ithaca, N.Y.

CHAIN DRIVES
Can. Link-Belt Co., Toronto, Ont.
Coventry Chain Co., Coventry, England.
Jones & Glassco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.

CHASERS
National Acme Co., Cleveland, Ohio.
Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.

CHEMISTS
Toronto Testing Labtory, Ltd., Toronto

CHISELS
Whitman & Barnes Co., St. Catharines.

CHUCKS, AERO, AUTOMATIC
Garvin Machine Co., New York.

CHUCKS, CENTERING
Hoggson & Pettis Mfg. Co., New Haven, Conn.

CHUCKS, COLLET, AIR
Elliott & Whitehall Mach. & Tool Co. Galt, Ont.
Smalley-General Co., Inc., Bay City, Mich.
Williams & Wilson, Ltd., Montreal, Que.

CHUCKS, DRILL, LATHE AND UNIVERSAL
Aikenhead Hardware Co., Toronto, Ont.
Almond Mfg. Co., Ashburnham, Mass.
Bicknell-Thomas Co., Greenfield, Mass.
Bertram & Sons Co., John, Dundas.
Can. Blower & Forge Co., Kitchener, Ont.
Can. Fairbanks-Morse Co., Ltd., Montreal
Cushman Chuck Co., Hartford, Conn.
Dom. Steel Products Co., Ltd., Bradford
Foss Mchy. & S'ply Co., G. F., Montreal.
Gardiner, Robt., & Son, Montreal.
Garlock-Walker Mach'y Co., Toronto.
Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Chicago, Ill.
Hoggson & Pettis Mfg. Co., New Haven, Conn.
Jacobs Mfg. Co., Hartford, Conn.
Scully Metal Products, Toronto.
Modern Tool Co., Erie, Pa.
Rice Lewis & Son, Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
Whiton Machine Co., D. E., New London, Conn.
Williams & Wilson, Ltd., Montreal, Que

CHUCKS, DRILL, AUTOMATIC AND KEYLESS
Aikenhead Hardware Co., Toronto, Ont
Bicknell-Thomas Co., Greenfield, Mass.
Can. Blower & Forge Co., Kitchener.
Whitney Mfg. Co., Hartford, Conn.

CHUCKS, FRICTION AND TAP
Bicknell-Thomas Co., Greenfield, Mass.
Victor Tool Co., Waynesboro, Pa.

CHUCKS, MACHINE MILLING
Hoggson & Pettis Mfg. Co., New Haven, Conn.

CHUCKS, MAGNETIC
Heald Machine Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

CHUCKS, RING WHEEL
Ford-Smith Mach. Co., Hamilton, Ont.
Gardner Machine Co., Beloit, Wis.

CHUCKS, WHEEL, CAR
Hoggson & Pettis Mfg Co., New Haven, Conn.

CHUCKING MACHINES
Brown & Sharpe Mfg. Co., Providence, R.I.
Garvin Machine Co., New York.
Gisholt Machine Co., Madison, Wis.
National Acme Co., Windsor, Vt.
Niles-Bement-Pond Co., New York
Roelofson Machine & Tool Co., Toronto.
Warner & Swasey Co., Cleveland, O.
Wood Turret Machine Co., Brazil, Ind.
Williams & Wilson, Ltd., Montreal, Que.

CIRCULATING SYSTEMS FOR LUBRICATING OIL
Bowser Co., Ltd., S. F., Toronto, Ont.
Williams & Co., H., Brooklyn, N.Y.

CLAMPS, BELT
Hoggson & Pettis Mfg. Co., New Haven, Conn.

CLEANERS, METER, WASTE, GENERAL
Oakley Chemical Co., New York, N.Y.

CLEANING COMPOUND
Oakley Chemical Co., New York.

CLOCK SPRINGS
The Dunbar Brothers Co., Bristol, Conn.

CLOCKS, WATCHMAN, PORTABLE
Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Inc., Chicago, Ill.

CLUTCHES, CHAIN
Wright Mfg. Co., Lisbon, Ohio.

CLUTCHES, FRICTION AND PULLEY
Bernard Industrial Co., A., Fortierville, Q.
Can. Link-Belt Co., Toronto, Ont.
Carlyle Johnson Mach. Co., Manchester, Conn.
Positive Clutch & Pulley Wks., Aurora, Ont.
Jones & Glassco, Montreal, Que.
Williams & Wilson, Ltd., Montreal, Que.

COAL HANDLING MACHINERY
Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Williams & Wilson, Limited, Montreal.
Nova Scotia Steel & Coal Co., New

COLD ROLLED STRIP, ALL METAL COLLARS, SHAFTING
Can. Driver-Harris Co., Ltd., Walkerville.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson Ltd., Montreal, Que.

COLLECTORS, PNEUMATIC
Can. Blower & Forge Co., Kitchener.
J. C. Wilson & Co., Belleville, Ont.

COLLETS
Becker Milling Machine Co., Boston.
Hardinge Bros., Inc., Chicago, Ill.
Wilson & Co., J. C. Belleville, Ont.

COMPOSITION INGOT
Brown's Copper & Brass Rolling Mills, New Toronto.
Canada Metal Co., Toronto, Ont.

COMPOUNDS, CUTTING AND GRINDING, DRAWING, STAMPING
Oakley Chemical Co., New York, N.Y.

COMBINED OPEN SIDE PLANER-SHAPER
Lynd-Farquhar Co., Boston, Mass.

COMPRESSORS, AIR
Can. Ingersoll-Rand Co., Sherbrooke.
Cleveland Pneumatic Tool Co., Toronto.
Curtis Pneumatic Machy. Co., St. Louis
Elliott & Whitehall, Galt, Ont.
Garlock-Walker Machy. Co., Toronto.
Hinckley Machine Co., Hinckley, Ill.
MacGovern & Co., Montreal, Que.
Williams & Wilson, Ltd., Montreal, Que

CONDENSERS
MacGovern & Co., Montreal, Que.
Smalley-General Co., Inc., Bay City, Mich.

CONNECTING RODS
Canada Found'y & Forgings, Ltd., Welland, Ont.

CONTRACT WORK
Brown Engineering Corp., Toronto.
Ford-Smith Machine Co., Hamilton, Ont.
Homer & Wilson, Hamilton, Ont.
Katie Foundry, Ltd., Galt, Ont.
Marten Machine Co., Hamilton, Ont.
St. Lawrence Welding Co., Montreal.
Victoria Foundry Co., Ottawa.
Wilson & Co., J. C., Belleville, Ont.
Windsor Mach. Tool Co., Windsor, Ont.

CONTROLLERS, MAGNETIC BRAKES, ELEC. WINCHES, MONO RAIL HOISTS
Volta Mfg. Co., Welland, Ont.

CONTROLLERS AND STARTERS
Williams Mach'y Co., A. R., Toronto

CONTROLLING INSTRUMENTS
Taylor Instrument Co., Rochester, N.Y.

CONVERTERS, ROTARY
MacGovern & Co., Montreal, Que.

CONVEYORS, BELT AND CHAIN
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.

CONVEYORS, OVERHEAD
Beatty Bros., Fergus, Ont.

COOLERS, WITH DRINKING FOUNTAINS
Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

COPING MACHINES
Bertram & Sons Co., John, Dundas, Ont.
Dom. Steel Products Co., Ltd., Bradford
Garlock-Walker Machine Co., Toronto.
Niles Bement-Pond Co., New York.
Can. Blower & Forge Co., Kitchener.

COPPER, BUS BAR, SHEET, PATES, RODS
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

COTTER PINS
Whitman & Barnes Co., St. Catharines.

COUNTERBORES AND COUNTERSINKS
Aikenhead Hardware Co., Toronto, Ont.
Blanchie Co., L. C., New York City.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

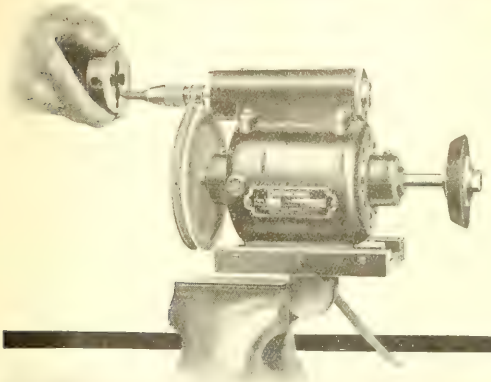
COUNTERSHAFTS
Almond Mfg. Co., Ashburnham, Mass.
Brown & Sharpe Mfg. Co., Providence, R.I.
Gray Ball Bearing Co., Ltd., Toronto.
Baird Machine Co., Bridgeport, Conn.
Ford-Smith Machine Co., Hamilton, Ont.
Foster Machine Co., Elkhart, Ind.
Williams & Wilson Ltd., Montreal, Que.

COUPLINGS, FRICTION
Bernard Industrial Co., The A., Fortierville, Que.
Can. Link-Belt Co., Toronto, Ont
Williams & Wilson, Ltd., Montreal, Que.

COUPLINGS, RAPID HOSE
Int. Machinery & Supply Co., Ltd., Montreal, Que.

COILING MACHINERY, WIRE AND SPRING
Garlock-Walker Machinery Co., Toronto.

COKE AND COAL
Hanna & Co., M. A., Cleveland, O.



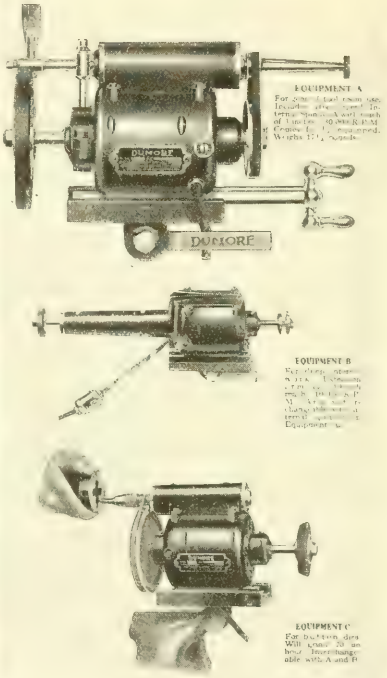
Regrinds Button-Dies in 3 Minutes

A GOOD example of one form of saving made possible through the use of the **DUMORE** grinder is found in the above illustration. Here is the attachment known as Equipment C that regrinds button-dies at the rate of twenty an hour. The special spring chuck holds an emery pencil that travels at the rate of 50,000 R. P. M. which has been found to be the correct cutting speed for work of this nature. Reclaiming these old and seemingly worthless dies, which formerly had to be discarded, means an enormous saving in the course of a few months.

The **DUMORE** grinder is portable and so constructed that the attachments are interchangeable. In other words, Equipment C may be detached and Equipments A or B put on. This gives the tool a very wide range of operation and makes it indispensable to the shop interested in securing the very best results. The **DUMORE** grinder is in perfect running balance and gives even small emery wheels the correct cutting speed. Chatter, taper or bell-mouthed grinding is thereby eliminated.

If your dealer does not carry the **DUMORE** in stock, write us for specifications and prices.

WISCONSIN ELECTRIC COMPANY
2918 16th Street — Racine, Wis.



EQUIPMENT A

EQUIPMENT B

EQUIPMENT C

DUMORE HIGH SPEED GRINDERS

COUPLINGS, PLAIN, FLEXIBLE AND CUT OFF

Cleveland Pneumatic Tool Co., of Canada, Toronto
Dominion Engine & Sup., Montreal
Independent Pneumatic Tool Co., Chicago
Wilson & Co., J. C., Belleville, Ont.

CRANES, LOCOMOTIVE

Ian Laing Sons, Inc., Toronto, Ont.
Northern Crane Works, Walkerville

CRANES, OVERHEAD, HAND AND ELECTRIC

Volta Manufacturing Co., Welland, Ont.

CUPS, OIL

Can. Wheeler Co., Ltd., Windsor, Ont.

COVERS, OIL HOLE

Can. Wheeler Co., Ltd., Windsor, Ont.

CRANES, GANTRY

Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.

CRANE RUNWAYS

MacKinnon Steel Co., Sherbrooke, Que.

CRANES, GOLIATH, PNEUMATIC AND PORTABLE

Morris Crane and Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Wilson & Co., J. C., Belleville
Williams & Wilson Ltd., Montreal, Que.

CRANES, TRAVELLING, ELECTRIC AND HAND POWER

Can. Link-Belt Co., Toronto, Ont.
Curtis Pneumatic Machy. Co., St. Louis.
Dominion Bridge Co., Montreal
Hepburn, John T., Ltd., Toronto.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Nlles-Bement-Pond Co., New York.
Northern Crane Works, Walkerville.

CRANK SHAFTS

Canada Foundry & Forgings Ltd., Welland
Williams & Co., J. H., Brooklyn, N.Y.

CRANES, PORTABLE

Aikenhead Hardware Co., Toronto, Ont.
Can. Link-Belt Co., Toronto.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Rice Lewis & Son, Toronto, Ont.
J. C. Wilson & Co., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que.

CRIMPS, LEATHER

Graton & Knight Mfg. Co., Worcester, Mass.

CRUSHERS

Elec. Steel & Metals, Welland, Ont.

CUPOLAS

Can. Blower & Forge Co., Kitchener.
Northern Crane Works, Walkerville.

CURB PUMPS FOR OIL, GASOLINE

Bowser Co., Ltd., S. F., Toronto, Ont.

CURRENT TRANSFORMERS

Volta Manufacturing Co., Welland, Ont.

CUT-OFF COUPLINGS, FRICTION

J. C. Wilson & Co., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que.

CUTTERS, BOLT

See Bolt Cutters.

CUTTERS, GEARS

Brown & Sharpe Mfg. Co., Providence, R.I.
Butterfield & Co., Inc., Rock Island, Que
Fellows Gear Shaper Co., Springfield, Vt.

CUTTERS, FLUE

Cleveland Pneumatic Tool Co., Toronto.

CUTTER HEADS

Oliver Machinery Co. Grand Rapids, Mich

CUTTERS, MILLING

Becker Milling Mach. Co., Boston, Mass.
Boker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island Que.
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Ltd., Montreal
Cleveland Twist Drill Co., Cleveland.
Davidson Tool Mfg. Co., New York, N.Y.
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garvin Machine Co., New York.
Illinois Tool Works, Chicago, Ill.
Morse Twist Drill & Machine Co., New Bedford.
Pratt & Whitney Co., Dundas, Ont.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son, Toronto, Ont.
Tabor Mfg. Co., Philadelphia, Pa.
Whitney Mfg. Co., Hartford, Conn.

CUTTER RELIEVING MACHINES

Cleveland Milling Machine Co., Cleveland.

CUTTING-OFF MACHINES

Armstrong Bros. Tool Co., Chicago.
Bertram & Sons Co., John, Dundas.
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Ltd., Montreal
Curtis & Curtis Co., Bridgeport, Conn.
Foss Mchy. & S'ply Co., Geo. F., Montreal
Garlock-Walker Machinery Co., Toronto.
Hurlburt, Rogers Machy. Co., South Framingham, Mass.
Hall & Sons, John H., Brantford, Ont.
Kennedy & Sons, Wm., Owen Sound.
Niles-Bement-Pond Co., New York, N.Y.
Peerless Machine Co., Racine, Wis.
Prest-O-Lite Co., Inc., Toronto, Ont.
Racine Tool & Machine Co., Racine, Wis
Tabor Mfg. Co., Philadelphia, Pa.
Wells Bros. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

CUTTING COMPOUND AND CUTTING OIL

Cataract Refining Co., Ltd., Toronto.

CUTTING OIL, RECLAIMING SYSTEM

Bowser Co., Ltd., S. F., Toronto, Ont.

CUTTING AND WELDING PLANTS

Davis-Bournonville Co., Jersey City, N.J.
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

CYANIDE AND LEAD BATH POTS

Swedish Crucible Steel Co., Windsor.

CYLINDERS, AIR

Ford-Smith Machine Co., Hamilton, Ont.
Smalley General Co., Inc., Bay City, Mich

CYLINDERS, AUTOMATIC REBORING JIGS AND REAMERS

Hinckley Machine Co., Hinckley, Ill.
Kelley Reamer Co., Cleveland, O.

DEHUMIDIFYING

B. F. Sturtevant Co., Galt, Ont.

DERRICKS

Aikenhead Hardware Co., Toronto, Ont.
Dominion Bridge Co., Montreal.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

DIAMOND (BORTZ)

Burnss, Clarke & Co., Montreal, Que.

DIAMOND TOOLS

Ford-Smith Machine Co., Hamilton, Ont.
Burnss, Clarke & Co., Montreal, Que.
Joyce, Koebel & Co., Inc., New York City.
Wheel Trueing Tool Co., Detroit.
Williams & Wilson, Limited. Montreal.

DIAMONDS, CARBON AND BORTZ

Wheel Trueing Tool Co., Detroit.

DIAMONDS, BLACK AND ROUGH

Joyce, Koebel & Co., Inc., New York.
Wheel Trueing Tool Co., Windsor, Ont.

DIE BLOCKS

General Steel Co., Milwaukee, Wis.

DIES, CUTTING

Hoggson & Pettis Mfg. Co., New Haven, Conn.

DIE HEADS, AUTOMATIC

Greenfield Tap & Die Corp., Greenfield Mass
Wells Bros. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

DIES, BRASS PRINTING, EMBOSSING AND LETTERING

Matthews, Jas. H., Co., Pittsburgh, Pa.

DIES FOR BIT BRACE USE

Butterfield & Co., Rock Island, Que.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Wells Brothers Co., of Canada, Galt.

DIES AND DIE STOCKS

Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Boker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Brown, Boggs Co., Hamilton, Ont.
Can. Fairbanks-Morse Co., Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Gardner, Robt. & Son, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Marshall, Son & Bunney, Toronto.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
National Acme Co., Cleveland, Ohio.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Rickert Shafer Co., Erie, Pa.
Stoll Co., Inc., D. H., Buffalo, N.Y.
Wells Brothers of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que

DIES, METAL STAMPING

Elliott & Whitehall, Galt, Ont.

DIES, PIPE THREADING

A. B. Jardine & Co., Ltd., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Williams & Wilson, Ltd., Montreal, Que.

DIES, THREADING

Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

DIE SINKERS

Becker Milling Machine Co., Boston
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.

DIES FOR MACHINES

Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Rock Island, Que.
Firth & Sons, Thos., Montreal, Que.
Landis Machine Co., Waynesboro, Pa.
Wells Brothers Co. of Canada, Galt.

DIE HEADS

Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Canada, Galt, Ont.

DIES, SELF-OPENING

Geometric Tool Co., New Haven
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
Wells Brothers Co. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que. Mass.

DIE FILING MACHINES

Oliver Mach. Co., Grand Rapids, Mich.

DIE STEEL, HOT AND COLD WORK

Armstrong-Whitworth Co. of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Marshall, Son & Bunney, Toronto.
Firth & Sons, Thos., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

DIES FOR SCREW PLATES

Butterfield & Co., Inc., Rock Island, Que.
Wells Bros. Co. of Can., Galt, Ont.

DIES, SHEET METAL WORKING

E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ont.
Stoll Co., D. H., Buffalo, N.Y.

DIES, SCREW AND THREAD

Butterfield & Co., Rock Island, Que.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
National-Acme Co., Cleveland, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co. of Can., Galt, Ont.

DISCS, LEATHER, STEEL

Graton & Knight Mfg. Co., Worcester, Mass.
Swedish Steel & Importing Co., Montreal.

DIRECT CONNECTED UNITS

MacGovern & Co., Montreal, Que.

DRAFT, MECHANICAL

W. H. Banfield & Sons, Toronto.
Butterfield & Co., Rock Island, Que.
Can. Blower & Forge Co., Kitchener.
A. B. Jardine & Co., Hespeler, Ont.
Pratt & Whitney Co., Dundas Ont.

DRAWING INSTRUMENTS

Hughes, Owens Co., Ltd., Montreal, Que.

DRAWING OFFICE SUPPLIES

Hughes, Owens Co., Ltd., Montreal, Que.

DRESSERS, GRINDING AND EMERY WHEEL

Can. Desmont-Stephan Mfg. Co., Hamilton
Dominion Abrasive Co., Ltd., Mimico, Ont.
Wheel Trueing Tool Co., Windsor, Ont.
Williams & Wilson, Limited, Montreal

DRILL PRESSES

Aurora Tool Works, Aurora, Ind.
W. F. & John Barnes Co., Rockford.
Can. Blower & Forge Co., Kitchener.
Canada Machinery Corp., Galt, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Machinery Co., Toronto
Garvin Machine Co., New York.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Niles-Bement-Pond Co., New York.
U. S. Mach. Tool Co., Cincinnati, Ohio.
A. R. Williams Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

DRILL RODS

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.
Swedish Steel & Importing Co., Ltd., Montreal.

DRILLING MACHINES, GANG

Barnes, W. F. & John, Co., Rockford, Ill.
Bilton Mach. Tool Co., Bridgeport, Conn
Canada Machinery Corp., Galt, Ont.
Silver Mfg. Co., Salem, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

DRILLING MACHINES, LOCOMOTIVE AND MULTIPLE SPINDLE

John Bertram & Sons Co., Dundas.
Bilton Mach. Tool Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Mach. Co., Toronto.
Garvin Machine Co., New York.
Hoefer Mfg. Co., Freeport, Ill
Henry & Wright Mfg. Co., Hartford, Conn
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
Nat. Automatic Tool Co., Richmond, Ind.
Niles-Bement-Pond Co., New York.
Rockford Drilling Mach Co., Rockford, Ill

DRILLING MACHINES, RADIAL AND TURRET

John Bertram & Sons Co., Dundas.
Canadian Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Henry & Wright Mfg. Co., Hartford,
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal.

DRILLING MACHINES, SENSITIVE

Bilton Mach. Tool Co., Bridgeport, Conn.
W. F. & John Barnes Co., Rockford, Ill.
Canadian Fairbanks-Morse Co., Montreal.
Canadian Machinery Corp., Galt, Ont.
Geo. F. Foss Mch. & S'ply Co., Montreal
Garlock-Walker Mach. Co., Toronto, Ont.
Henry & Wright Mfg. Co., Hartford, Conn.
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
United States Mach. Tool Co., Cincinnati
Williams & Wilson, Limited, Montreal.

DRILLING MACHINES, UPRIGHT AND HORIZONTAL

Aurora Tool Works, Aurora, Ind.
John Bertram & Sons Co., Dundas.
Garlock-Walker Mach. Co., Toronto, Ont
Can. Blower & Forge Co., Kitchener.
Canada Mach. Corp., Galt, Ont.
Garvin Machine Co., New York.
Ford-Smith Machine Co., Hamilton, Ont.
Garlock-Walker Mach. Co., Toronto, Ont.
Hoefer Mfg. Co., Freeport, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Keagle Metal Products, Toronto.
Landis Tool Co., Waynesboro, Pa.
R. McDougall Co., Galt.
Nat. Automatic Tool Co., Richmond, Ind.
Rockford Drilling Mach. Co., Rockford, Ill
Niles-Bement-Pond Co., New York.
Silver Mfg. Co., Salem, Ohio.
A. R. Williams Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

DRILLING MACHINES, SPECIAL

Hoefer Mfg. Co., Freeport, Ill.

DRILLING MACHINES, WALL RADIAL

Lynd-Farquhar Co., Boston, Mass.
Wickes Bros, Saginaw, Mich.

DRILLING POSTS

Aikenhead Hardware Co., Toronto, Ont.
Keystone Mfg. Co., Buffalo, N.Y.
Rice Lewis & Son, Toronto, Ont.
Silver Mfg. Co., Salem, Ohio.

DRILLS, BENCH

Aikenhead Hardware Co., Toronto.
W. F. & John Barnes Co., Rockford, Ill
Can. Blower & Forge Co., Kitchener.
Can. Fairbanks-Morse Co., Montreal.
Geo. F. Foss Mch. & S'ply Co., Montreal
Fry's (London), Ltd., London, England
Garlock-Walker Machinery Co., Toronto.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
U.S. Electrical Tool Co., Cincinnati, O.
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, CENTRE

Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Morrow Screw & Nut Co., John, Ingersoll
Morse Twist Drill & Machine Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co., of Can., Walkerville
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, BLACKSMITH AND BIT STOCK

Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Inc., Rock Island, Que.
Can. Blower & Forge Co., Kitchener.
Cleveland Twist Drill Co., Cleveland.
Geo. F. Foss Mch. & S'ply Co., Montreal
A. B. Jardine & Co., Hespeler, Ont.
Morrow Screw & Nut Co., John, Ingersoll
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilkinson & Kompass, Hamilton, Ont.
Wilt Twist Drill Co. of Can., Walkerville

DRILLS, CARBON

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que.
Marshall, Son & Bunney, Toronto.
John Morrow Screw & Nut Co., Ingersoll

DRILLS, ELECTRIC, PORTABLE

Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener.
Boker & Co., Inc., H., Montreal, Que.
Cincinnati Electrical Tool Co., Cincinnati
Geo. F. Foss Mch. & S'ply Co., Montreal
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York.
Pilot Steel & Tool Co., Montreal, Que.
Prest-O-Lite Co., Inc., Toronto, Ont.
U. S. Electrical Tool Co., Cincinnati, O.
A. R. Williams Mach. Co., Toronto.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, EMERY

Garlock-Walker Mach. Co., Toronto, Ont.

DRILLS, HIGH SPEED TWIST

Aikenhead Hardware Co., Toronto, Ont.
Armstrong-Whitworth of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Canadian Fairbanks-Morse Co., Montreal
H. A. Drury Co., Montreal.
Geo. F. Foss Mch. & S'ply Co. Montreal
Marshall, Son & Bunney, Toronto.
Morrow Screw & Nut Co., John, Ingersoll, Ont.
Morse Twist Drill & Machine Co., New Bedford, Mass.
W. F. & John Barnes Co., Rockford, Ill
Plewes, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Taylor J. A. M., Star Bldg., Toronto.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que

DRILLS, OIL TUBE

Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.

DRILLS, PNEUMATIC

Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal.
Greenfield Tap & Die Corp., Greenfield.

DRILLS, PNEUMATIC CORNER

Can. Ingersoll-Rand Co., Montreal, Que.
Canadian Pneumatic Tool Co. of Can Limited, Montreal.
Gardner-Walker Machinery Co., Toronto
Independence Pneumatic Tool Co., Chicago.

DRILLS, RATCHET AND HAND

Armstrong Bros. Tool Co., Toronto, Ont.
Armstrong Bros. Tool Co., Chicago, Ill.
Can. Fairbanks-Morse Co., Kitchener, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Cincinnati Electrical Tool Co., Cincinnati.
Cleveland Twist Drill Co., Cleveland.
Raymond Manufacturing Co., Toronto, Ont.
A. R. Jardine & Co., Hespeler, Ont.
Morrow Screw & Nut Co., John, Ingersoll, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Ross Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville.

DRILLS, ROCK

Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co., Toronto.
The Foss Mchy. & Supply Co., Montreal.
A. R. Williams Machy. Co., Toronto.

DRILLS, TRACK

Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
The Foss Mchy. & Supply Co., Montreal.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Wilt Twist Drill Co. of Can., Walkerville.

DRINKING FOUNTAINS, SANITARY

Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

DRIVES, CHAIN

See Belting, Chain.

DRIVING TOOLS

The Thos. Pink Co., Ltd., Pembroke, Ont.

DRY CLEANING SYSTEM

Bowser Co., Ltd., S. F., Toronto, Ont.

DRYERS, SAND

Pangborn Corporation, Hagerstown, Md.

DRYING APPLIANCES

Baird Machine Co., Bridgeport, Conn.
W. S. Rockwell Co., New York, N.Y.

DRUM CONTROLS

Volta Manufacturing Co., Welland, Ont.

DUMP CARS

Canadian Fairbanks-Morse Co., Montreal.
MacKinnon Steel Co., Sherbrooke, Que.

DUST EXHAUSTER. ARRESTER SYSTEM

Pangborn Corporation, Hagerstown, Md.

DUST HANDLING EQUIPMENT

Pangborn Corporation, Hagerstown, Md.

DUST SEPARATORS

Can. Blower & Forge Co., Kitchener, Ont.

DYNAMOS AND ELECTRICAL SUPPLIES

Canadian Fairbanks-Morse Co., Montreal.
Lancashire Dynamo & Motor Co., Ltd., Toronto.
MacGovern & Co., Montreal, Que.
A. R. Williams Machy. Co., Toronto.

ELECTRICAL SUPPLIES

Can. General Electric Co., Toronto, Ont.

ELECTRIC FURNACES

Electro Furnace Construction Co., Philadelphia, Pa.
Volta Manufacturing Co., Welland, Ont.

EECTRIC FURNACE REGULATORS, WINCHES, ROOF COOLERS AND ELECTRODE HOLDERS

Volta Manufacturing Co., Welland, Ont.

ELECTRICAL RESISTANCE MATERIALS, NICHROME, KROMORE, CHROMAX, CLIMAX, NICKEL, SILVER, ADVANCE.

Can. Driver-Harris Co., Walkerville, Ont.

ELECTRIC HOISTS, STATIONARY AND MONO RAIL

Volta Manufacturing Co., Welland, Ont.

ELECTRIC MOTORS

Volta Manufacturing Co., Welland, Ont.

ELEVATOR, ENCLOSURES

Volta Mfg. Co., Welland, Ont.
Canada Wire & Iron Goods Co., Hamilton

ELEVATOR WEIGHTS

Karle Foundry, Galt, Ont.

ELEVATORS AND BUCKETS

Can. Link-Belt Co., Toronto, Ont.
Curtis Pneumatic Machy. Co., St. Louis.
Williams & Wilson, Ltd., Montreal, Que.

ELEVATING AND CONVEYING MACHINERY

Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Williams & Wilson, Ltd., Montreal, Que.

EMBOSSING PRESSES

Dom. Steel Products Co., Ltd., Brantford.
Oliver Machinery Co., Grand Rapids, Mich

EMERY GRINDERS (PNEUMATIC)

Cleveland Pneumatic Tool Co., Toronto.
Ingersoll Machine Co., Hamilton, Ont.

EMERY AND EMERY WHEELS

Brantford Emery Wheel Co., Brantford, Canada.
The Foss Mchy. & Supply Co., Montreal.
Gurney Machine Co., New York.
Canadian Fairbanks-Morse Co., Montreal.
Canada Emery Wheels Co., Hamilton.
Dominion Abrasive Wheel Co., Ltd., Malvern, Ont.
Ideal Smith Mach. Co., Hamilton, Ont.
Ross Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.
Dominion Abrasive Wheel Co., Ltd., Malvern, Ont.

EMERY WHEEL DRESSINGS

Dominion Abrasive Co. Ltd. Malvern, Ont.
Wheel Truing Tool Co., Windsor, Ont.

END MILLS

John Morrow Screw & Nut Co., Ingersoll

ENGINEERS—INDUSTRIAL CLEANING (Free Consultation)

Oakley Chemical Co., New York, N.Y.

ENGINES, STEAM, GAS, GASOLINE

Dominion Bridge Co., Montreal, Que.
Canadian Fairbanks-Morse Co., Montreal.
Johnson Mach. Co., Carlyle, Manchester, Conn.
MacGovern & Co., Montreal, Que.

ENGINES, HORIZONTAL AND VERTICAL

Johnson Mach. Co., Carlyle, Manchester, Conn.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

ENGINES, HEAVY OIL, DIESEL TYPE

Dom. Steel Products Co., Ltd., Brantford.

ENGINES, MARINE

Can. Ingersoll-Rand Co., Sherbrooke, Que.

ENGRAVERS

Pritchard-Andrews Co., Ottawa.

ESCUTCHEON PINS

Parmenter & Bulloch, Gananoque, Ont.

EXHAUST HEADS AND HOODS

Can. Blower & Forge Co., Kitchener, Ont.
Canadian Fairbanks-Morse Co., Montreal.

EXHAUSTERS

Can. Blower & Forge Co., Kitchener, Ont.
Pangborn Corporation, Hagerstown, Md.
Williams & Wilson, Ltd., Montreal, Que.

EXTRACTORS, TAP

Walton Co., The, Hartford, Conn.

EYE BOLTS AND NUTS

Can. Foundries & Forgings, Ltd., Welland, Ont.

EYE PROTECTORS

Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.

FACTORY GAGES

Page Steel & Wire Co. Adrian, Mich.

FACTORY LOCATIONS

City of St. Johns, Quebec.

FACTORY SITES

City of St. Johns, Quebec.

FANS

Baird Machine Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont.

FENCING, WIRE

Page Steel & Wire Co., New York, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

FENCE, IRON AND FACTORY

Can. Wire & Iron Goods, Hamilton, Ont.
Page Steel & Wire Co., Adrian, Mich.

FERRO-TUNGSTEN

Vanadium-Alloys Steel Co., Pittsburgh, Pa

FILES

Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Wm., Sheffield, Eng.
Ingersoll File Co., Ltd., Ingersoll, Ont.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Marshall, Son & Bunney, Toronto, Ont.
Nicholson File Co., Port Hope, Ont.
Rice Lewis & Son, Toronto, Ont.
Simonds Mfg. Co., Fitchburg, Mass.
Whitman & Barnes Mfg. Co., Akron, O.
Wilkinson & Kompass, Hamilton, Ont.

FILTERING AND CIRCULATING SYSTEMS FOR LUBRICATING OIL

Bowser Co., Ltd., S. F., Toronto, Ont.
Can. Wire & Iron Goods, Hamilton, Ont.

FINISHING MACHINES

Brown & Sharpe Mfg. Co., Providence, R.I.

FIRST AID CABINETS

Strong, Kennard & Nutt Co., Cleveland.

FIRE EXTINGUISHERS

Strong, Kennard & Nutt Co., Cleveland, O.

FIXTURES

Brown Engineering Corp., Toronto, Ont.
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Illinois Tool Works, Chicago, Ill.
Marben Machine Co., Hamilton, Ontario.
Toronto Tool Co., Toronto, Ont.

FLAT SPRINGS

The Dunbar Brothers Co., Bristol, Conn.

FLANGING CLAMPS

Wickes Bros., Saginaw, Mich.

FLOTATION MACHINERY

Elec. Steel & Metals, Welland, Ont.

FLUMES

William Hamilton Co., Peterboro, Ont.

FORGES, HAND PORTABLE

Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener.
A. R. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.

FORGINGS, STEEL AND IRON

Blancke Co., L. C., New York City.

FORGINGS

Mesta Machine Co., Pittsburgh, Pa.
Can. Found. & Forgings, Ltd., Welland.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

FORGINGS, DROP, AUTOMOBILE AND LOCOMOTIVE FORGING AND WELDING

Blancke Co., L. C., New York City.
Dominion Bridge Co., Montreal, Que.
Dom. Forge & Stamp'g Co., Walkerville.
Steel Co. of Canada, Ltd., St. Catharines.
Victoria Foundry Co., Ottawa.
Williams & Co., R., Brooklyn, N.Y.

FORGING MACHINERY

John Bertram & Sons Co., Dundas, Ont.
Bliss, E. W., Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
National Machy. Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

FORGINGS, SPECIAL

Armstrong-Whitworth of Can., Montreal.
Blancke Co., L. C., New York City.
Can. Found. & Forgings, Ltd., Welland.
Williams & Co., J. H., Brooklyn, N.Y.

FORMING

Brown & Sharpe Mfg. Co., Providence, R.I.

FOUNTAINS, DRINKING

Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

FRICTION LEATHERS

Graton & Knight Mfg. Co., Montreal.

FRICTION SURFACE BELTING

Can. Consolidated Rubber Co., Montreal.

FUEL OIL SYSTEMS

Bowser Co., Ltd., S. F., Toronto, Ont.
Gilbert & Barker Mfg. Co., Springfield.

FURNACES, ANNEALING, CASE HARDENING AND TEMPERING

Bellevue Furnace Co., Detroit, Mich.
Brown & Sharpe Mfg. Co., Providence, R.I.
Chicago Flexible Shaft Co., Chicago, Ill.
Gilbert & Barker Mfg. Co., Springfield.
Mechanical Eng'r'g Co., Three Rivers, Q.
W. S. Rockwell Co., New York, N.Y.
Standard Engr. Co., Detroit, Mich.
Williams & Wilson, Ltd., Montreal, Que.

FURNACES, BLAST

Bellevue Industrial Furnace Co., Detroit.
W. S. Rockwell Co., New York, N.Y.
Toronto Iron Works, Ltd., Toronto.

FURNACES, FORGING

Gilbert & Barker Mfg. Co., Springfield.
W. S. Rockwell Co., New York, N.Y.

FUSE BOXES, STEEL

Dom. Forge & Stamp. Co., Walkerville.

GANG PLANER TOOLS

Armstrong Bros. Tool Co., Chicago.

GAS AND STEAM ENGINES

Mesta Machine Co., Pittsburgh, Pa.

GASKETS, LEATHER, ETC.

Graton & Knight Mfg. Co., Montreal.

GASOLINE METERS

Bowser Co., Ltd., S. F., Toronto, Ont.

GASOLINE TANKS

Bowser Co., Ltd., S. F., Toronto, Ont.

GASOLINE PUMPS. SELF-MEASURING

Bowser Co., Ltd., S. F., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence, R.I.

GAUGES

Elliott & Whitehall Mach. & Tool Co., Galt, Ont.

GAUGE BLOCKS

Wilton & Mfg. Co., Boston, Mass.

GAUGERS, CALIPERS

Williams & Co., J. H., Brooklyn, N.Y.

GAUGES, MERCURY COLUMN, DRAFT

Taylor Instrument Co., Rochester, N.Y.

GAUGES, HYDRAULIC

Taylor Instrument Co., Rochester, N.Y.

GAUGES, MANUFACTURERS, LIMIT, THREAD

Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Can., Galt, Ont.

GAUGES, STANDARD

Brown Engineering Corp., Toronto, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Garrin Machine Co., New York.
Illinois Tool Works, Chicago, Ill.
C. E. Johanson, Inc., Toronto, Ont.
Morse Twist Drill & Machine Co., New Bedford.
Peck, Stow & Wilcox Co., Southington, Conn.
Pratt & Whitney Co., Hartford, Conn.
Taylor, J. A. M., 318 Stair Bldg., Toronto
Toronto Tool Works, Toronto, Ont.
Wells Brothers Co. of Canada, Galt, Ont.
Worth Engineering Co., Toronto, Ont.

GAUGES, THREAD

Bickmell-Thomas Co., Greenfield, Mass.

GAUGES, VACUUM AND PRESSURE

Bristol Co., Waterbury, Conn.
Taylor Instrument Co., Rochester, N.Y.

GAUGES, SNAP, THREAD AND CYLINDRICAL

C. E. Johanson, Inc., Toronto, Ont.

GEAR BLANKS

Can. Steel Foundries, Ltd., Montreal,
Dom. Found. & Steel, Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

GEAR BLANKS, CAST

Katie Foundry, Galt, Ont.

GEAR SHAPERS AND CUTTERS

Fellows Gear & Shaper Co., Springfield, V.

GEAR-CUTTING MACHINERY

Bilton Mach. Tool Co., Bridgeport, Conn.
Fellows Gear & Shaper Co., Springfield, V.
Garlock-Walker Mchy. Co., Toronto, Ont.
D. E. Whiton Machine Co., New London, Conn.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

GEAR-TESTING MACHINE

Gisholt Machine Co., Madison, Wis.

GEAR-TURNING MACHINES, BEVEL

Bridgeford Mach. Tool Wks, Rochester

GEAR BOXES, REDUCTION

Coventry Chain Co., Coventry, Eng.

GEARS, CHAIN

Morse Chain Co., Ithaca, New York.

GEARS, COMPENSATING

Morse Chain Co., Ithaca, New York.

GEARS, CUT, MORTISE, ANGLE, WORM

Baxter & Co., Ltd., J. R., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Dom. Steel Products Co., Ltd., Brantford.
Dominion Bridge Co., Montreal, Que.
Dom Foundries & Steel, Hamilton, Ont.
Elliott & Whitehall, Galt, Ont.
Gardner, Robt., & Son, Montreal.
Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Hull Iron & Steel Found., Ltd., Hull, Q
Illinois Tool Work, Chicago, Ill.
Jones & Glassco, Montreal.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.
Philadelphia Gear Works, Philadelphia
Victoria Foundry Co., Ottawa.
Wilson & Co., J. C., Belleville, Ont.

GEARS, RAWHIDE

Gardner, Robt., & Son, Montreal.
Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Jones & Glassco, Montreal.
Philadelphia Gear Works, Philadelphia.
A. R. Williams Machy. Co., Toronto.

GENERATORS, GEAR

Fellows Gear & Shaper Co., Springfield, V.

GEARS, SPRING

Morse Chain Co., Ithaca, New York.

GEARS, SPUN, BENCH, SPIRAL

Brown & Sharpe Mfg. Co., Providence, R.I.

GEARS, SILENT CHAIN GENERATORS, STEAM TURBO

Can. General Electric Co., Toronto, Ont.

GENERAL MACHINE WORK

Elliott & Whitehall, Galt, Ont.

GENERATORS AND CONVERTORS

Can. General Electric Co., Toronto, Ont.

GENERATORS, MOTOR

A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal.
MacGovern & Co., Montreal.

GERMAN SILVER

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

GLOVES, ASBESTOS, ACID PROOF, WATERPROOF, ETC.

Strong, Kennard & Nutt Co., Cleveland.

GLUE HEATERS

Oliver Machinery Co., Grand Rapids, Mich

GLASSES, SAFETY

Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.

GOVERNOR, WATER WHEEL

Wilson & Co., J. C., Belleville, Ont.

GRAPHITE

Aikenhead Hardware, Ltd., Toronto.
Rice Lewis & Son, Toronto.

GOGGLES

Consolidated Optical Co., Toronto.
Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.
Welding & Supplies Co., Montreal.

GRAVITY CARRIERS

Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

GREASE CUPS, PRESSED STEEL, BRASS

Can. Winkley Co., Ltd., Windsor, Ont.

GREASES (See Lubricants)

GRINDERS, AUTOMATIC KNIFE

Canada Machinery Corp., Galt, Ont.
Foss Mchry. & S'ply Co., G. F., Montreal
Garlock-Walker Machinery Co., Toronto.

GRINDERS, CENTRE COLUMN, PEDESTAL AND BENCH

Wisconsin Electric Co., Inc., Racine, Wis.
Can. Machinery Corp., Galt, Ont.

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Celoglas
Shatter-Proof Lens

Replacing a pair of lenses in Stoco Safety Goggles is only a matter of seconds. You don't even need the pliers shown in the illustration. A pencil will do—or a good stout thumb-nail. If your stock clerk is ruining his chances of salvation while he juggles a tiny screw driver and a microscopic screw, replacing pitted lenses, he'll appreciate this feature.

Price per Hundred

With extra heavy optical glass lenses	$ 90.00
With Celoglas shatter-proof lenses	115.00

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Lenses Only.

Per Hundred Pairs

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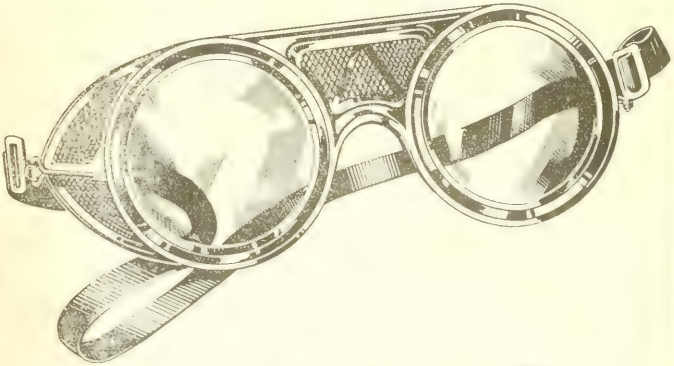
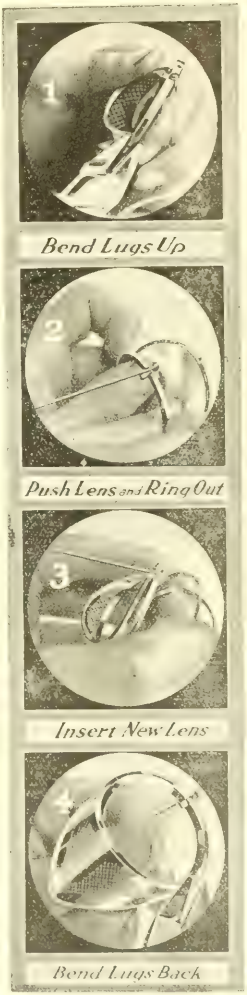
Celoglas shatter-proof lenses	55.00

A sample of the Stoco Safety Goggle will be sent without charge to interested responsible people.





STANDARD OPTICAL CO. GENEVA, N.Y.

If interested tear out this page and [illegible] letters to be answered.

Cleveland Pneumatic Tool Co., Toronto.
Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Machinery Co., Toronto.
[illegible], Galt, Ont.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Machine Co., New Bedford.
Niles-Bement-Pond Co., New York, N.Y.
[illegible] Machine Co., Galt, Ont.
United States Elec. Tool Co., Cincinnati.
Williams & Wilson, Limited, Montreal.

GRINDERS, CUTTER

Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati Milling Mach. Co., Cincinnati.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garvin Machine Co., New York.
Greenfield Machine Co., Greenfield, Mass.
Greenfield Tap & Die Corp., Greenfield, M.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Manhattan Machine & Tool Co., Grand Rapids, Mich.
Norton Co., Worcester, Mass.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal.

GRINDERS, DIE AND CHASER

Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
National-Acme Co., Cleveland, Ohio.

GRINDERS, DISK

Armstrong Bros. Tool Co., Chicago, Ill.
Ford-Smith Mach. Co., Hamilton.
Gardner Machine Co., Beloit, Wis.
Heald Machine Co., Worcester, Mass.

GRINDERS, FLEXIBLE CASTING

Manhattan Machine & Tool Co., Grand Rapids, Mich.

GRINDERS, DRILL

Aikenhead Hardware Co., Toronto.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield.
United States Elec. Tool Co., Cincinnati.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal.

GRINDERS, CYLINDER, INTERNAL

Brown & Sharpe Mfg. Co., Providence, R.I.
Foss Mchy. & S'ply Co., G. F., Montreal.
Greenfield Machine Co., Greenfield, Mass.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Norton Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal.

GRINDERS, PORTABLE, ELECTRIC HAND, TOOL POST, FLOOR AND BENCH

Baird Machine Co., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati Electrical Tool Co., Cincinnati.
Ford-Smith Mach. Co., Hamilton, Ont.
Wisconsin Electric Co., Inc., Racine, Wis.
Grant Mfg. & Mach. Co., Bridgeport, Con.
Garlock-Walker Machinery Co., Toronto.
Greenfield Machine Co., Greenfield, Mass.
Independent Pneumatic Tool Co., Chicago.
United States Elec. Tool Co., Cincinnati.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal.
Wilkinson & Kompass, Hamilton, Ont.

GRINDERS, MANUFACTURING

Universal Grinding Mach. Co., Fitchburg, Mass.

GRINDERS, HOLE, HOLE AND FACE AND DEEP HOLE

Bryant Chucking Grinder Co., Springfield, Vermont.
Heald Machine Co., Worcester, Mass.

GRINDERS, PLAIN CYLINDRICAL

Fitchburg Grinding Mach. Co., Fitchburg, Mass.

GRINDERS, PNEUMATIC

Can. Ingersoll-Rand Co., Montreal.
Cleveland Pneumatic Tool Co., Toronto.
Garlock-Walker Machinery Co., Toronto.
Heald Machine Co., Worcester, Mass.
Independent Pneumatic Tool Co., Chicago.
MacGovern & Co., Montreal, Que.

GRINDERS, PROFILE

Cleveland Milling Machine Co., Cleveland.

GRINDERS, ROTARY SURFACE

Brown & Sharpe Mfg. Co., Providence, R.I.
Bristol Machine Tool Co., Bristol, Conn.
Manhattan Machine & Tool Co., Grand Rapids, Mich.

GRINDERS, TOOL AND HOLDER

Armstrong Bros. Tool Co., Chicago.
W. F. & John Barnes Co., Rockford, Ill.
Blount & Co., J. G., Everet, Mass.
Brown & Sharpe Mfg. Co., Providence, R.I.
Ford-Smith Machine Co., Hamilton, Ont.
Greenfield Machine Co., Greenfield, Mass.
Greenfield Tap & Die Corp., Greenfield.
National-Acme Co., Cleveland, Ohio.
Tabor Mfg. Co., Philadelphia, Pa.
Wells Bros. of Canada, Galt, Ont.

GRINDERS, UNIVERSAL, PLAIN

Manhattan Machine & Tool Co., Grand Rapids, Mich.
Modern Tool Co., Erie, Pa.
Norton Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal.

GRINDERS, VERTICAL, SURFACE

Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Montreal.
Heald Machine Co., Worcester, Mass.
Pratt & Whitney Co., Dundas, Ont.
Gisholt Machine Co., Madison, Wis.
Norton Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal.

GRINDING AND POLISHING MACHINES, PORTABLE, PNEUMATIC AND SPRING FRAME

Can. Fairbanks-Morse Co., Montreal.
Cincinnati Elec. Tool Co., Cincinnati, O.
Ford-Smith Mach. Co., Hamilton, Ont.
Gardner & Son, Robt., Montreal.
Garvin Machine Co., New York.
Garlock-Walker Machy. Co., Toronto.
Greenfield Machine Co., Greenfield, Mass.
Hall & Sons, John H., Brantford, Ont.
LeBlond Mch. Tool Co., R. K., Cincinnati.
Niles-Bement-Pond Co., New York, N.Y.
Norton Co., Worcester, Mass.
Wisconsin Electric Co., Racine, Wis.
Williams & Wilson, Ltd., Montreal.

GRINDING MACHINES, CAR WHEEL, CUTTER, CYLINDRICAL, CRANKSHAFT

Brown & Sharpe Mfg. Co., Providence, R.I.
Norton Co., Worcester, Mass.

GRINDING WHEELS

Aikenhead Hardware Co., Toronto, Ont.
Brantford Emery Wheel Co., Brantford.
Can. Fairbanks-Morse Co., Montreal.
Dominion Abrasive Wheel Co., Ltd., Mimico, Ont.
Ford-Smith Machine Co., Hamilton, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Norton Co., Worcester, Mass.

GRINDING WHEEL DRESSER

Dominion Abrasive Wheel Co., Ltd., Mimico, Ont.

GUARDS, WINDOW AND MACHINE

Canada Machinery Corp., Galt, Ont.
Canada Wire & Iron Goods Co., Hamilton.
Dennis Wire & Iron Works, London, Ont.
Page Steel & Wire Co., Adrian, Mich.
Strong, Kennard & Nutt Co., Cleveland.

HANDLES, BALANCE, CRANK AND MACHINE

Williams & Co., J. H., Brooklyn, N.Y.

GUTTERS AND SKYLIGHTS

H. H. Robertson, Ltd., Sarnia, Ont.

HACK SAW BLADES

Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blancke Co., L. C., New York City.
Boker & Co., Inc., H., Montreal, Que.
Can. Fairbanks-Morse Co., Montreal.
Diamond Saw & Stamping Wks., Buffalo.
Ford-Smith Machine Co., Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Fry's (London), Ltd., London, England.
Racine Tool & Machine Co., Racine, Wis.
Plewes, Ltd., Winnipeg, Man.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son, Toronto, Ont.
Simonds Mfg. Co., Fitchburg, Mass.
L. S. Starrett Co., Athol, Mass.
Standard Machy. & Supplies, Montreal.
Victor Saw Works, Ltd., Hamilton.
Wilkinson & Kompass, Hamilton.
Williams & Wilson, Ltd., Montreal.

HACK SAW FRAMES

Aikenhead Hardware Co., Toronto.
Can. Fairbanks-Morse Co., Montreal.
Ford-Smith Machine Co., Hamilton, Ont.
Garvin Machine Co., New York City.
Victor Saw Works, Hamilton, Ont.
Rice Lewis & Son, Toronto, Ont.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal.

HACK SAWS, POWER

Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Diamond Saw & Stamping Wks., Buffalo.
Foss Mchy. & S'ply Co., G. F., Montreal.
Ford-Smith Machine Co., Hamilton.
Peerless Machine Co., Racine, Wis.
Racine Tool & Mach. Co., Racine, Wis.
Starrett Co., L. S., Athol, Mass.
Victor Saw Works, Hamilton, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal.

HAMMERS, FORGING

Nazel Eng. & Mach. Wks., Philadelphia.

HAMMERS, HATCHETS

Whitman & Barnes Co., St. Catharines.

HAMMERS (DROP), MOTOR AND BELT DRIVEN

Beaudry & Co., Boston, Mass.
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton.
Can. Billings & Spencer, Ltd., Welland.
Canada Machinery Corp., Galt, Ont.
High Speed Hammer Co., Rochester, N.Y.
Jardine & Co., A. B., Hespeler, Ont.
Niles-Bement-Pond Co., New York, N.Y.
Toledo Machine & Tool Co., Toledo.
United Hammer Co., Boston, Mass.
Williams & Wilson, Ltd., Montreal.

HAMMERS, HELVE POWER

Canada Machinery Corp., Galt, Ont.
West Tire Setter Co., Rochester, N.Y.
Williams & Wilson, Limited, Montreal.

HAMMERS, CHIPPING, CAULKING, PNEUMATIC

Can. Ingersoll-Rand Co., Montreal, Que.
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Nazel Eng. & Mach. Wks., Philadelphia.

HAMMERS, MARKING

Matthews & Co., Jas. H., Pittsburgh, Pa.

HAMMERS, NAIL MACHINE

Rice Lewis & Son, Toronto, Ont.
United Hammer Co., Boston, Mass.

HAMMERS, POWER

Nazel Eng. & Mach. Wks., Philadelphia.

HAMMERS, STEAM

Canada Machinery Corp., Galt, Ont.
Niles-Bement-Pond Co., New York.

HAND PLANERS

Oliver Mchy. Co., Grand Rapids, Mich.

HAND LEATHERS OR PADS

Graton & Knight Mfg. Co., Montreal.

HANGERS

Brown & Sharpe Mfg. Co., Providence, R.I.

HANGERS, SHAFT

Algoma Steel Corp., Sault Ste. Marie.
Can. General Electric Co., Toronto, Ont.
Chapman Double Ball Bearing Co., Toronto.
Gray Ball Bearing Co., Ltd., Toronto.
Baird Machine Co., Bridgeport, Conn.
Can. S K F Co., Toronto, Ont.
Gardner & Son, Robt., Montreal.
Jones & Glassco, Montreal.
Standard Pressed Steel Co., Philadelphia.
Williams & Wilson, Limited, Montreal.

HARDNESS TESTING INSTRUMENTS

Shore Instrument & Mfg. Co., New York.

HEAD, AUXILIARY

Hoefer Mfg. Co., Freeport, Ill.

HEATING AND VENTILATING ENGINEERS

Can. Blower & Forge Co., Kitchener, Ont.

HEAT TREATMENT OF STEEL

Gray Ball Bearing Co., Ltd., Toronto.

HEAT GAUGES, HARDENING AND ANNEALING

Shore Instrument & Mfg. Co., New York.

HELMETS, SANDBLAST, AMMONIA

Strong, Kennard & Nutt Co., Cleveland.

HIGH SPEED STEEL

See Steel.

HINGE MACHINERY

Baird Machine Co., Bridgeport, Conn.
Illinois Tool Works, Chicago, Ill.

HINGES

Butterfield & Co., Inc., Rock Island, Que.
London Bolt & Hinge Wks., London, Ont.

HOBS

Greenfield Tap & Die Co., Greenfield, Mass.
Illinois Tool Works, Chicago, Ill.
Pratt & Whitney Co., Dundas, Ont.
Taylor, J. A. M., 318 Stair Bldg., Toronto.
Wells Bros. of Canada, Galt, Ont.

HOISTS, AIR

Can. Ingersoll-Rand Co., Ltd., Sherbrooke.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

HOISTS, CHAIN AND PNEUMATIC

Can. Ingersoll-Rand Co., Montreal, Que.
Garlock-Walker Machinery Co., Toronto.
Ford Chain Block & Mfg., Philadelphia.
Independent Pneumatic Tool Co., Chicago.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Wright Mfg. Co., Lisbon, Ohio.
Williams & Wilson, Limited, Montreal.

HOISTS, ELECTRICAL

Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Electric Steels & Metals Ltd., Welland.
Kennedy & Sons, Owen Sound, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Williams & Wilson, Limited, Montreal.

HOISTS, ELEC., STATIONARY, MONO RAIL

Volta Mfg. Co., Welland, Ont.

HOLDERS, STEEL DIE FOR MARKING

Matthews & Co., Jas. H., Pittsburgh, Pa.

HOLDERS, ELECTRIC

Electric Steels & Metals Ltd., Welland.

HOOKS, BELT LACING

Clipper Belt Lacer Co., Grand Rapids.

HOPPERS

MacKinnon Steel Co., Ltd., Sherbrooke.
Dominion Bridge Co., Montreal, Que.
William Hamilton Co., Peterboro, Ont.
Toronto Iron Works, Ltd., Toronto, Ont.

HOSE, PNEUMATIC

Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Wells Bros. Co. of Canada, Galt, Ont.

HOSE, ALL KINDS

Int. Mach. & Supply Co., Ltd., Montreal.

HOSE, SAND BLAST

Pangborn Corporation, Hagerstown, Md.

HUMIDIFIERS

Sturtevant Co., B. F., Galt, Ont.

HYDRAULIC ACCUMULATORS

Dom. Steel Products Co., Ltd., Brantford.

HYDRAULIC MACHINERY

Garlock-Walker Machinery Co., Toronto.
Dom. Steel Products Co., Ltd., Brantford.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.
Perrin, Ltd., William R., Toronto.
West Tire Setter Co., Rochester, N.Y.
Victoria Foundry Co., Ottawa.
Williams & Wilson, Limited, Montreal.

HYDROMETERS, HYGROMETERS, HYGRODEIKS

Taylor Instrument Co., Rochester, N.Y.

INDICATORS, SPEED

Aikenhead Hardware Co., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence.
Starrett Co., L. S., Athol, Mass.

INDEX CENTRES

Brown & Sharpe Mfg. Co., Providence, R.I.
Dickow, Fred. C., Chicago, Ill.
Ford-Smith Machine Co., Hamilton, Ont.
Garvin Machine Co., New York.
Williams & Wilson, Limited, Montreal.

INDICATING INSTRUMENTS

Taylor Instrument Co., Rochester, N.Y.

INDUSTRIAL SITES

City of St. Johns, Quebec.

INGOT METAL

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

INGOTS, STEEL

Nova Scotia Stl. & Coal Co., New Glasgow.

INGOTS, FORGING AND ROLLING

Electric Steel & Metals Co., Welland.

INSULATING COMPOUNDS

Robertson Co., Ltd., H. H., Sarnia, Ont.

INSTRUMENTS, ENGINEERING

Consolidated Optical Co., Toronto.

IRON ORE

Hanna & Co., M. A., Cleveland, O.

IRON, WROUGHT, ROLLED, PIG

Swedish Steel & Impt. Co., Ltd., Montreal.

JACKS

Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Norton, A. O., Coaticook, Que.
Rice Lewis & Son, Toronto, Ont.
Williams & Wilson, Limited, Montreal.

JACKS, PIT AND TRACK

Canadian Fairbanks-Morse Co., Montreal.
Northern Crane Works, Walkerville.

JAWS, FACE PLATE

Cushman Chuck Co., Hartford, Conn.
Dom. Steel Products Co., Ltd., Brantford.
Skinner Chuck Co., New Britain, Conn.

JOINTERS

Gray Ball Bearing Co., Ltd., Toronto.

JIGS, TOOLS, ETC.

Brown Engineering Corp., Toronto.
Elliott & Whitehall Mach. & Tool Co., Galt.
Gisholt Machine Co., Madison, Wis.
Globe Engineering Co., Ltd., Hamilton.
Homer & Wilson, Hamilton, Ont.
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ont.
Toronto Tool Co., Toronto, Ont.

JOURNAL WEDGES

Canada Foundries & Forgings, Welland.

KEY SEATERS

Garlock-Walker Machy. Co., Toronto, Ont.
Garvin Machine Co., New York.
Morton Mfg. Co., Muskegon Heights, M.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Limited, Montreal.

KEYS, MACHINE

Whitney Mfg. Co., Hartford, Conn.
Williams & Co., J. H., Brooklyn, N.Y.

KILNS

Can. Blower & Forge Co., Kitchener, Ont.
Kennedy & Sons, Wm., Owen Sound, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

KNIFE GRINDERS

Gray Ball Bearing Co., Ltd., Toronto.

LABELS AND TAGS

Matthews & Co., Jas. H., Pittsburgh, Pa.

LABORATORIES, INSPECTION AND TESTING (see Chemists)

LADLES, FOUNDRY

Northern Crane Works, Walkerville.

LACING MACHINES

Clipper Belt Lacer Co., Grand Rapids, M.

LAMPS, ARC, INCANDESCENT

Can. General Electric Co., Toronto, Ont.

LAMPS, TUNGSTEN AND NITRO

Can. General Electric Co., Toronto, Ont.

LAG SCREW GIMLET POINTERS

National Machy. Co., Tiffin, Ohio.

LATH

Robertson, Ltd., H. H., Sarnia, Ont.

LATHES, CHUCKING

Acme Machine Tool Co., Cincinnati, Ohio.
Wood Turret Machine Co., Brazil, Ind.
Williams & Wilson, Limited, Montreal.

LATHE CHUCKS (See Chucks)

LATHE DOGS AND ATTACHMENTS

Armstrong Bros. Tool Co., Chicago.
Curtis & Curtis Co., Bridgeport, Conn.

Hendey Machine Co., Torrington, Conn.
Williams & Co., F. H., Brooklyn, N.Y.

LATHES, AUTOMATIC AND SEMI AUTOMATIC

Gisholt Machine Co., Madison, Wis.
Wood Turner Machine Co., Brazil, Ind.

LATHES, AXLE

Ingersoll Mach. Tool Works, Rochester.
Gisholt Machine Co., Madison, Wis.

LATHES, BORING

Bridgeford Mach. Tool Works, Rochester.
Cincinnati Milling Machine Co., Cincinnati, O.
Ledge & Shipley, Cincinnati, O.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, PRECISION, BENCH

W. F. & John Barnes Co., Rockford, Ill.
J. G. Blount & Co., Everett, Mass.
Canadian Fairbanks-Morse Co., Montreal.
Geo. F. Free Machy. & Supply Co., Montreal.
Garlock Walker Machinery Co., Toronto.
Manning Bros., Chicago, Ill.
Pratt & Whitney Co., Dundas, Ont.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, BRASS

Acme Machine Tool Co., Cincinnati, Ohio.
Hardinge Bros., Chicago, Ill.
Wood Turner Machine Co., Brazil, Ind.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, ENGINE

Acme Machine Tool Co., Cincinnati, Ohio.
John Bertram & Sons Co., Dundas.
Bridgeford Mach. Tool Wks., Rochester.
Canada Machine Tool Co., Galt, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Cleco Machine Tool Co., Cincinnati, Ohio.
Wickes Bros., Saginaw, Mich.
G. F. Free Mchy. & Sply Co., Montreal.
Garlock Walker Machinery Co., Toronto.
Garlock Walker Machy. Co., Toronto, Ont.
Gisholt Machine Co., Madison, Wis.
Kennedy & Sons Wm., Owen Sound, Ont.
R. McDougall Co., Galt.
Mike Smith Pond Co., New York.
Rae Mach. Tool Co., Hamilton.
Smalley-General Co., Inc., Bay City, Mich.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Sidney Tool Co., Sidney, Ohio.
Walcott Lathe Co., Jackson, Mich.
Whitcomb Blaisdell Mach. Tool Co., Worcester, Mass.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.
Worcester Lathe Co., Worcester, Mass.

LATHES, FOOT POWER

Seneca Falls Mfg. Co., Seneca Falls, N.Y.

LATHES, HORIZONTAL

Wood Turner Machine Co., Brazil, Ind.

LATHES, JOURNAL TRUEING

Bridgeford Mach. Tool Works, Rochester.
Canada Machine Tool Co., Galt, Ont.

LATHE MANDRELS, HARDENED AND GROUND

Elliott & Whitehall, Galt, Ont.

LATHES, PATTERNMAKERS'

J. G. Blount Co., Everett, Mass.
Can. Machinery Corp., Galt.
Wood Turner Machine Co., Brazil, Ind.
G. F. Free Mchy. & Sply Co., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, POLISHING

Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, SCREW CUTTING

Bertram & Sons Co., John, Dundas, Ont.
Bridgeford Mach. Tool Works, Rochester.
Canada Machinery Corp., Galt, Ont.
Cleco Machine Tool Co., Cincinnati, O.
Foss Mchy. & Sply Co., G. F., Montreal.
Foster Machine Co., Elkhart, Ind.
Garlock Walker Machy. Co., Toronto, Ont.
Hartford Bros. Inc., Chicago, Ill.
Hepburn Ltd., John T., Toronto, Ont.
Niles-Bement-Pond Co., New York.
Rae Mach. Tool Co., Hamilton.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.
Wickes Bros., Saginaw, Mich.
Williams Machy. Co., A. R., Toronto.
Wood Turner Machine Co., Brazil, Ind.
Worcester Lathe Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, SPINNING

Elbe Co., F. W., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, TOOL ROOM

Cleco Machine & Tool Co., Cincinnati, O.
Canada Machinery Corporation, Galt, Ont.
Rae Mach. Tool Co., Hamilton.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Worcester Lathe Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

LEAD BURNING

St. Lawrence Welding Co., Montreal.

LEAD BURNING OUTFITS

Turner Brass Works, Sycamore, Ill.

LEATHER STRAPPING

Graton & Knight Mfg. Co., Worcester, M.

LENSES FOR GOGGLES

Standard Optical Co., Geneva, N.Y.

LETTERS AND FIGURES, METAL

Hoffman & Billings Mfg. Co., New Haven, Conn.

LEVELS

Hughes Owens Co., Montreal, Que.

LIDS, SCREW TOP AND HINGE

Can. Wadkin Co., Ltd., Windsor, Ont.

LINK BELTING

See Belting, Chain.

LINOLEUM MILL MACHINERY

Cartmans, Ltd., Edinburgh, Scotland.

LOCKERS, STEEL WARDROBE AND STEEL MATERIAL

Canada Wire & Iron Goods Co., Hamilton
Dennis Wire & Iron Works Co., London, Ont.

LUBRICANTS

Cataract Refining & Mfg. Co., Toronto.

LUBRICANTS, CUTTING AND GRINDING, DRAWING, STAMPING

Dunlop Graphite Co., New York, N.Y.

LUBRICATING, OIL FILTERING AND CIRCULATING SYSTEMS

Dunlop Graphite Co., Ltd., S. F., Toronto, Ont.

LUBRICATORS

Trabern Pump Co., Rockford, Ill.

LUMBERMEN'S TOOLS

Thos. Pink Co., Ltd., Pembroke, Ont.

MACHINE COUNTER WEIGHTS

Katie Foundry, Galt, Ont.

MACHINE TOOLS

Rae Mach. Tool Co., Hamilton.

MACHINERY, CORNER AND BENDING

Peck, Stow & Wilcox Southington, Conn

MACHINERY DEALERS

Archibald & Co., Chas. P., Montreal.
Can. Fairbanks-Morse Co., Montreal.
Elliott & Whitehall, Galt, Ont.
Foss Mchy. & Sply Co., Montreal.
Garlock Walker Machy. Co., Toronto, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MACHINERY GUARDS (See Guards)

MACHINERY SUPPLIES

Kennedy Metal Products, Toronto.

MACHINERY, SPECIAL

Goold Locomotive Co., Ltd., Hamilton.
Hoggson & Pettis Mfg. Co., New Haven, Conn.

MACHINISTS' TOOLS

Brown & Sharpe Mfg. Co., Providence, R.I.

MAGNETIC BRAKES FOR ELECTRIC MOTORS

Volta Mfg. Co., Welland, Ont.

MANDRELS

Butterfield & Co., Inc., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Jardine & Co., A. B., Hespeler, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

MARKING DEVICES

Pritchard-Andrews Co., of Can., Ottawa.
Matthews & Co., Jas. H., Pittsburgh, Pa.

MARKING MACHINERY

Brown, Boggs Co., Hamilton, Ont.
Foss Mchy. & Sply Co., G. F., Montreal.
Perrin, Wm. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MASKS, WELDING, SMOKE, FUME, GAS, ETC.

Strong, Kennard & Nutt Co., Cleveland.

MEASURING MACHINES

Pratt & Whitney Co., Dundas, Ont.

MEASURES, REGISTERING

Bowser Co., Ltd., S. F., Toronto, Ont.

MEASURING TAPES AND RULES

Chesterman & Co., Jas., Sheffield, Eng.

METALLURGISTS

See Chemists.

METAL CLEANERS

Oakley Chemical Co., New York, N.Y.

METAL SAWS

See Saws.

METAL SAWS, POWER

Hoefer Mfg. Co., Freeport, Ill.

METALS

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.
Canada Metal Co., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.

METAL, STAMPINGS, SMALL

Can. Winkley Co., Ltd., Windsor, Ont.

METERS, OIL, GASOLINE, KEROSENE, ETC.

Bowser Co., Ltd., S. F., Toronto, Ont.

MICROMETERS

Almond Mfg. Co., Ashburnham, Mass.
Taylor, J. M., 319 Slair Bldg., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MILLS, BRACE AND TUBE

Elec. Steel & Metals, Welland, Ont.

MILLS, SAND

Frost Mfg. Co., Chicago, Ill.

MILL MACHINERY

Alexander Fleck, Ltd., Ottawa.
Greenfield Tap & Die Corp., Greenfield
Wells Bros. of Canada, Galt, Ont.

MILLING ARBORS

Brown & Sharpe Mfg. Co., Providence, R.I.
Kearney & Trecker Co., Milwaukee Wis.

MILLING ATTACHMENTS

Becker Milling Machine Co., Boston, Mass.
Bertram & Sons Co., John, Dundas, Ont.
Brown & Sharpe Mfg. Co., Providence.
Canada Machinery Corp., Galt, Ont.
Cincinnati Milling Machine Co., Cincinnati
Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mchy. & Sply Co., G. F., Montreal
Hardinge Bros., Inc., Chicago, Ill.
Hendey Mach. Co., Torrington, Conn.
Hinckley Machine Works, Hinckley, Wis.
Kearney & Trecker Co., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Niles Bement-Pond Co., New York.
Taft-Peirce Mfg. Co., Woonsocket, R.I.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, AUTOMATIC

Baton Mach. Tool Co., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence, R.I.
Betts Machine Co., Rochester, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

MILLING CUTTERS

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que.
Bastian Co., L. C., New York city.
Cleveland Milling Machine Co., Cleveland.
Kearney & Trecker Co., Milwaukee, Wis.
Marshall, Son & Bunney, Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, HAND

Bristol Machine Tool Co., Bristol, Conn.

MILLING MACHINES, THREAD

Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Inc., Chicago, Ill.
Gray Ball Bearing Co., Ltd., Toronto.
United States Mach. Tool Co., Cincinnati.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, HORIZONTAL AND VERTICAL

Becker Milling Machine Co., Boston, Mass.
Bristol Machine Tool Co., Bristol, Conn.
Brown & Sharpe Mfg. Co., Providence.
Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Ford-Smith Mach. Co., Hamilton, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
Gooley & Eglund, Cortland, N.Y.
Hardinge Bros., Inc., Chicago, Ill.
Kearney & Trecker Co., Milwaukee, Wis.
Knight Metal Products, Toronto.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
United States Mach. Tool Co., Cincinnati.
Whitney Mfg. Co., Hartford, Conn.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, PLAIN, BENCH AND UNIVERSAL

Becker Milling Machine Co., Boston, Mass.
Bilton Mach. Tool Co., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence.
Canada Machinery Corp., Galt, Ont.
Cleveland Milling Machine Co., Cleveland.
Cincinnati Milling Machine Co., Cincinnati
Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mchy. & Sply Co., G. F., Montreal
Garlock-Walker Machy. Co., Toronto, Ont.
Garvin Machine Co., New York.
Kempsmith Machy. Co., Tiffin, Ohio.
Gooley & Eglund, Inc., Cortland, N.Y.
Hardinge Bros., Inc., Chicago, Ill.
Hender Machine Co., Torrington, Conn.
Kearney & Trecker Co., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Knight Metal Products, Toronto.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, PLATE

Marshalltown Mfg. Co., Marshalltown, Ia.

MILLING MACHINES, PROFILE

Brown & Sharpe Mfg. Co., Providence.
Can. Fairbanks-Morse Co., Montreal.
Foss Mchy & S'ply Co., G. F., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

MILLING TOOLS

Aikenhead Hardware Co., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence.
Ford-Smith Mach. Co., Hamilton, Ont.
Geometric Tool Co., New Haven, Conn.
Kempsmith Mfg. Co., Milwaukee, Wis.
Rice Lewis & Son, Toronto, Ont.
Tabor Mfg. Co., Philadelphia, Pa.
Williams & Wilson, Ltd., Montreal, Que.

MINE CARS

Can. Fairbanks-Morse Co., Montreal.
Dominion Bridge Co., Montreal, Que.
Elec. Steel & Metals, Welland, Ont.
MacKinnon Steel Co., Sherbrooke, Que.
Modern Tool Co., Erie, Pa.
Pratt & Whitney Co., Dundas, Ont.

MINING MACHINERY

Can. Fairbanks-Morse Co., Montreal.
Elec. Steel & Metals, Welland, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MIXERS, SAND

Frost Mfg. Co., Chicago, Ill.

MORTISING MACHINES

Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
Gray Ball Bearing Co., Ltd., Toronto.

MOTORS, ELECTRIC

Can. Fairbanks-Morse Co., Montreal.
Can. General Electric Co., Toronto.
Garlock-Walker Machy. Co., Toronto, Ont.
Lancashire Dynamo & Motor Co., Ltd., Toronto.
MacGovern & Co., Montreal, Que.
Volta Mfg. Co., Welland, Ont.
Williams Machy. Co., A. R., Toronto
Williams & Wilson, Ltd., Montreal, Que

MOTOR SPRINGS

The Dunbar Brothers Co., Bristol, Conn.

MOTORCYCLE FRAME AND FORK

The Dunbar Brothers Co., Bristol, Conn.

MOTORS, PNEUMATIC

Cleveland Pneumatic Tool Co., Toronto.

MOULDS, RUBBER

Hoggson & Pettis Mfg. Co., New Haven, Conn.

MULTIPLE INDEX CENTRES

Garvin Machine Co., New York.
Graton & Knight Mfg. Co., Worcester, M.

MULTI-DRILLING, MULTI-BORING, MULTI-TAPPING MACHINERY,

Nat. Automatic Tool Co., Richmond, Ind.

MUNICIPALITIES

City of St. John, Quebec.

MUNTZ METAL

Brown's Copper & Brass Roller Mills, New Toronto, Ont.

MUSIC WIRE

Blancke Co., L. C., New York City.

NAIL SETS

Morrow Screw & Nut Co., J., Ingersoll, Ont

NAME PLATES, BRONZE, ETCHED AND STAMPED

Matthews & Co., Jas. H., Pittsburgh, Pa.
Pritchard-Andrews Co., Ottawa, Ont.
Turner Brass Works, Sycamore, Ill.

NICHROME CASTINGS

Can. Driver-Harris Co., Ltd., Walkerville.

NICKEL

Baker & Co., Inc., H., Montreal, Que.
Pilot Steel & Tool Co., Montreal, Que.

NICKEL SILVER

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

NICKEL STEEL

See Steel.

NIPPLE HOLDERS

Curtis & Curtis Co., Bridgeport, Conn.

NIPPLE THREADING MACHINES

Hall & Sons, Ltd., John H., Brantford.
Landis Machine Co., Waynesboro, Pa.

NITROGEN

Carter Welding Co., Toronto, Ont.

NUTS, STEEL, CASTELLATED AND COLD PRESSED

Galt Machine Screw Co., Ltd., Galt, Ont.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Williams & Co., J. H., Brooklyn, N.Y.

NUTS, SEMI-FINISH AND FINISHED

Gait Machine Screw Co., Galt, Ont.
National-Acme Co., Cleveland, Ohio.
Wilkinson & Kompass, Hamilton.

NUT BURRING AND NUT MACHINES (HOT)

National Machy. Co., Tiffin, Ohio.

NUT FACING AND BOLT SHAVING MACHINES

Garvin Machine Co., New York.
National Machinery Co., Tiffin, Ohio.
Victor Tool Co., Waynesboro, Pa.
Williams & Wilson, Ltd., Montreal, Que.

NUT TAPPERS

Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
Hall & Son, J. H., Brantford, Ont.
Jardine & Co., A. B., Hespeler.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

OILERS

All Way Oiler Mfg. Co., Toronto, Ont.

OIL SEPARATORS

Can. Fairbanks-Morse Co., Montreal.

OIL STONES

Aikenhead Hardware Co., Toronto, Ont.
Carborundum Co., Niagara Falls, N.Y.
Norton Co., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

OIL STONE GRINDERS

Oliver Machy. Co., Grand Rapids, Mich.

OIL STORAGE SYSTEMS

Bowser Co., Ltd., S. F., Toronto, Ont.

OPENING DIE HEADS

Greenfield Tap & Die Corp, Greenfield.
Wells Bros. of Canada, Galt, Ont.

OPTICAL SUPPLIES

Consolidated Optical Co., Toronto, Ont.

OSCILLATING VALVE GRINDERS (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Canada, Toronto.

OVENS FOR BAKING, BLUING, DRYING, ENAMELING, JAPANNING AND LACQUERING

Brantford Oven & Rack Co., Brantford.

OVEN TRUCKS, STEEL

Brantford Oven & Rack Co., Brantford.
MacKinnon Steel Co., Sherbrooke, Que.

OVENS FOR DRYING, TEMPER AND OXYGEN, ELECTROLYTIC CELLS UNDER TRUCKS

Welding & Supplies Co., Montreal, Que.
Brantford Oven & Rack Co., Brantford.

OXY-ACETYLENE WELDING AND CUTTING AND OUTFITS

Carter-Welding Co., Toronto, Ont.
Prest-o-Lite Co., Inc., Toronto, Ont.
Davis Bournonville Co., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.
Welding & Supplies Co., Montreal, Que.

OXYGEN

Nat. Electro Products Ltd., Toronto, Ont.

OXYGEN PLANTS (ELECTROLYTIC)

Davis-Bournonville Co., Toronto, Ont.

PACKINGS, ASBESTOS

Cleveland Wire Spring Co., Cleveland.

PACKINGS, LEATHER, HYDRAULICS, ETC.

If interested tear out this page and place with letters to be answered.

Perrin, Ltd., William R., Toronto.

PANS, WET AND DRY

Grost Mfg. Co., Chicago, Ill.

PAPER MILL CONVEYORS AND DRIVES

Bertrams Ltd., Edinburgh, Scotland.
Can. Link-Belt Co., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

PARTITIONS, WIRE

See Guards

PAPER MILL MACHINERY

Garlock Walker Machinery Co., Toronto.
MacKinnon Steel Co., Sherbrooke, Que.

PATTERN SHOP EQUIPMENT

Canada Machinery Corp., Galt, Ont.
Garlock Walker Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PATTERN MAKERS' LATHES

See Lathes.

PATENT SOLICITORS

Budden, Hanbury A., Montreal.
Fetherstonhaugh & Co., Ottawa.
Marion & Marion, Montreal.
Ridout & Maybee, Toronto.
Sharman & Co., H. C., Ottawa.
Wilson & Co., J. C., Belleville, Ont.
Greenlaw & Ltd., Belleville, Ont.
Morton Machine Co., Hamilton, Ont.

PECK CARRIERS FOR POWER PLANTS

Can. Link-Belt Co., Toronto, Ont.

PENSTOCKS

Williams Hamilton Co., Peterboro, Ont.

PERFORATED METALS AND ORNAMENTAL IRON GOODS

Canada Wire & Iron Goods Co., Hamilton

PHOTOSTATS

Commercial Camera Co., Providence, R.I.

PIG IRON

Hanna & Co., M. A., Cleveland, O.
Steel Co. of Canada, Ltd., Hamilton, Ont.

PINS, TAPER

Morrow Screw & Nut Co., J., Ingersoll, Ont

PINS, BELT-LACING

Clipper Belt Lacer Co., Grand Rapids.

PIPE FITTINGS, MALLEABLE AND CAST IRON

International Malleable Iron Co., Guelph

PIPE CUTTING AND THREADING MACHINES

Can. Fairbanks-Morse Co. Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Garlock Walker Machinery Co., Toronto.
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield.
Hall & Sons, John H., Brantford.
Jardine & Co., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
McDougall Co., R., Galt.
Wells Bros. Co. of Canada, Galt, Ont.
Williams Tool Co., Erie, Pa.
Williams Machy Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PIPE RIVETED STEEL

Toronto Iron Works, Ltd., Toronto.
William Hamilton Co., Peterboro, Ont.

PIERCING

Oliver Machy. Co., Grand Rapids, Mich.

PIPE CUTTERS, ROLLING

Curtis & Curtis Co., Bridgeport, Conn.
Greenfield Tap & Die Corp., Greenfield.
Hall & Sons, Ltd., John H., Brantford.
Wells Bros. Co. of Canada, Galt, Ont.

PIPE TOOLS AND DIES

Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.

PIPE CUTTERS AND REAMERS

Greenfield Tap & Die Corp. Greenfield.
Wells Bros. of Canada, Galt, Ont.

PIPE STOCKS AND THREADERS

Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada Galt, Ont.

PIPE TAPS AND VISES

Greenfield Tap & Die Corp. Greenfield.
Wells Bros. of Canada, Galt, Ont.

PIPE WRENCHES

Greenfield Tap & Die Corp. Greenfield.
Wells Bros. of Canada Galt, Ont.

PISTON AND PISTON RING MACHINES

National Acme Co., Windsor, Vt.

PLANER BOLTS

Morrow Screw & Nut Co., J., Ingersoll, Ont

PLANER JACKS

Armstrong Bros. Tool Co., Chicago.

PLANERS, STANDARD AND ROTARY

Betts Machine Co., Rochester, N.Y.
Bertram & Sons Co., John, Dundas.
Oliver Machy. Co., Grand Rapids, Mich.
Canada Machinery Corp. Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Can. Machy. & Supply Co., P. Montreal
Garlock Walker Machinery Co., Toronto.
Garvin Machine Co., New York.
Morton Mfg. Co., Muskegon Heights, Mich
Niles-Bement-Pond Co., New York
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

PLANING AND SHAPING MACHINERY

Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Fess Mach. & Sply. Co., G. P., Montreal.
Garlock-Walker Machinery Co., Toronto.
Garvin Machine Co., New York.
Niles-Bement-Pond Co., New York.
Williams Machy Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PLANER-SHAPER, COMBINED OPEN SIDE

Lund-Farquhar Co., Boston.
Williams & Wilson, Ltd., Montreal, Que.

POWER HAMMERS

Quickwork Co., St. Marys, Ohio.

PLANING MILL EXHAUSTERS

Can. Blower & Forge Co. Kitchener, Ont.
MacSween & Co., Montreal, Que.
Niles-Bement-Pond Co., New York.

PLIERS

Aikenhead Hardware Co., Toronto.
Can. Bullings & Spencer, Ltd., Welland.
Peck, Stow & Wilcox Co., Southington, Ct.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Co., St. Catharines.

PNEUMATIC TOOLS

Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pmatic Tool Co., Can., Toronto.
Curtis Pneumatic Machy Co., St. Louis.
Garlock-Walker Machy Co., Toronto.
Int. Mach. & Supply Co., Ltd., Montreal.
Independent Pneumatic Tool Co., Chicago.

POWER CRANES, HAND

MacKinnon Steel Co., Sherbrooke, Que.

POLISHING MACHINES

Brown & Sharpe Mfg. Co., Providence, R.I.
Ford Smith Machine Co. Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.

POTS AND KETTLES, CAST STEEL

Elec. Steel & Metals, Welland, Ont.

POLISHING PLATES

Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

POWER HOUSE CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

POWER TRANSMISSION MCHY.

Williams & Wilson, Ltd., Montreal, Que.

PRESSED STEEL PARTS

Gray Ball Bearing Co., Ltd., Toronto.

PRESSERS, ARBOR

Atlas Press Co., Kalamazoo, Mich
Metalwood Mfg. Co., Detroit, Mich.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, BROACHING, FORGING AND FLANGING

Atlass Press Co., Kalamazoo, Mich.
Bliss Co., E. W., Brooklyn, N.Y.
Dom. Steel Products Co., Ltd., Brantford
Metalwood Mfg. Co., Detroit, Mich
Toledo Machine & Tool Co., Toledo.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, CAM, TOGGLE, EYELET

Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N.Y.
Consolidated Press Co., Hastings, Mich.
Toledo Machine & Tool Co., Toledo.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, FILTER

Perrin, Ltd., William R., Toronto.
Smalley-General Co., Inc., Bay City, Mich.

PRESSES, PNEUMATIC

Dom. Steel Products Co., Ltd., Brantford.
Metalwood Mfg. Co., Detroit, Mich.
Toledo Machine & Tool Co., Toledo.

PRESSES, DROP AND FORGING

Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co. Ltd., Hamilton.
Can. Fairbanks-Morse Co., Montreal.
Niles-Bement-Pond Co., New York.
Perrin, Ltd., William R., Toronto.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co. Toledo.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, HYDRAULIC

Bertram & Sons Co., John, Dundas.
Dom. Steel Products Co., Ltd., Brantford.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.
Perrin, Ltd., William R., Toronto.
Toledo Machine & Tool Co. Toledo
Stoll Co., D. H., Buffalo, N.Y.
West Tire Setter Co., Rochester, N.Y.
Williams Machy Co., A. R. Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, BALING

Perrin, Ltd., William R., Toronto.

PRESSES, POWER

Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Consolidated Press Co., Hastings, Mich
Garlock-Walker Machinery Co., Toronto.
Perrin, Ltd., William R., Toronto.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, SPRING FOOT

Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co., Hamilton, Ont.
Consolidated Press Co., Hastings, Mich.
Toledo Machine & Tool Co., Toledo
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, SCREW

Barnes & Co., W. F. & Jno., Rockford, Ill
Bliss Co., E. W., Brooklyn, N.Y.
Manhattan Machine & Tool Co., Grand Rapids, Mich
Perrin, Ltd., William R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, SEAL

Hoggson & Pettis Mfg. Co., New Haven, Conn.

PRESSES, TRIMMING

Bliss Co., E. W., Brooklyn, N.Y.
Canada Machinery Corp., Galt, Ont.
Consolidated Press Co. Hastings, Mich.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

PROPELLERS

Kennedy & Sons, Wm., Owen Sound.

PROTECTIVE COATINGS

H. H. Robertson, Ltd., Sarnia, Ont.

PSYCROMETERS, SLING

Taylor Instrument Co., Rochester, N.Y.

PULLEYS

Algoma Steel Corp., Sault Ste. Marie, Ont
American Pulley Co., Philadelphia.
Baird Machine Co., Bridgeport, Conn.
Bernard Industrial Co., Porterville, Que.
Brown & Sharpe Mfg. Co., Providence.
Can. Fairbanks-Morse Co., Montreal.
Ford-Smith Machine Co., Hamilton, Ont.
Kennedy & Sons, Ltd., W., Owen Sound.
Positive Clutch & Pulley Works Ltd., Toronto.
Wilson & Co., J. C., Belleville, Ont.
William Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PULLEYS, STEEL SASH, STEEL BELT

American Pulley Co., Philadelphia, Pa.

PULLEYS, FRICTION, CLUTCH

American Pulley Co., Philadelphia, Pa.
Baird Machine Co., Bridgeport, Conn.
Bernard Industrial Co., Porterville, Q.
Can. Link-Belt Co., Toronto, Ont.
Carlisle Johnson Mch Co., Manchester, Ct.
Positive Clutch & Pulley Works, Toronto.
Jones & Glasco, Montreal.
Williams & Wilson, Ltd., Montreal, Que.

PULP MILL MACHINERY

MacKinnon Steel Co. Sherbrooke, Que.

PUMPS, BOILER FEED

Geo. W. Cole, Ltd., Toronto

PUMPS, CENTRIFUGAL

Bowser Co., Ltd., S. F., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Blower & Forge Co., Kitchener, Ont.
Can. Ingersoll-Rand Co., Montreal, Que.
Darling Bros., Ltd., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

PUMPS, FUEL OIL

Bowser Co., Ltd., S. F., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence, R.I.
Darling Bros., Ltd., Montreal, Que.
Trahern Pump Co., Rockford, Ill.

PUMPS, GEARED

Darling Bros., Ltd., Montreal, Que.

PUMPS, HIGH PRESSURE

Perrin, Ltd., William R., Toronto.

PUMPS, HYDRAULIC

Cumiss, Clark & Co., Montreal, Que.
Garlock-Walker Machinery Co., Toronto.
Darling Bros., Ltd., Montreal, Que.
Elec. Steel & Metals, Welland, Ont.
Metalwood Mfg. Co., Detroit, Mich.
Perrin, Ltd., William R., Toronto
Williams & Wilson, Ltd., Montreal, Que.

PUMPS, LUBRICATING, OIL STORAGE

Bowser Co., Ltd., S. F., Toronto, Ont.

PUMPS, SPECIAL

Elec. Steel & Metals, Welland, Ont.

PUMPS, RUBBER CEMENT

Bowser Co., Ltd., S. F., Toronto, Ont.

PUMPS, KEROSENE, OIL, SELF-MEASURING

Bowser Co., Ltd., S. F., Toronto, Ont.

PUMPS, LUBRICANT, OIL, WATER

Darling Bros., Ltd., Montreal, Que.
Fry's (London), Ltd., London, England.
Trahern Pump Co., Rockford, Ill.

PUMPS, SUD

Fry's (London), Ltd., London, England.

PUMP LEATHERS

Graton & Knight Mfg. Co., Worcester.

PUNCHES AND DIES

Atkins & Co., Ltd., Wm., Sheffield, Eng.
F. W. Bliss Co., Brooklyn, N.Y.
Boker & Co., Inc., H., Montreal, Que.
Brown, Boggs Co., Ltd., Hamilton, Can.
Can. Blower & Forge Co., Kitchener, Ont.
Can. Fairbanks-Morse Co., Montreal.
Gardner & Son, Robert, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Marshall, Son & Blunney, Toronto.
Marten Machine Co., Hamilton, Ont.
York Shear & Widow Co. Southington, Ct.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo, O.
Whitman & Barnes Co., St. Catharines.
Williams & Wilson, Ltd., Montreal, Que.

PUNCHES, HAND

Peck, Stow & Wilcox Co., Southington, Ct.

PUNCHES, POWER

John Bertram & Sons Co., Dundas, Ont.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd, Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.
Dom. Steel Products Co., Ltd., Brantford.
Garlock-Walker Machinery Co., Toronto.
A. B. Jardine & Co., Hespeler, Ont.
Long & Allbutter, Hamilton, Ohio.
Niles-Bement-Pond Co., New York.
D. H. Stoll Co., Buffalo, N.Y.
Wickes Bros., Saginaw, Mich.
Williams & Wilson, Ltd., Montreal, Que.

PUNCHING MACHINES, HORIZONTAL

Bertrams, Ltd., Edinburgh, Scotland.
Bertrams & Sons, John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Garlock-Walker Mach'y. Co., Toronto.
Niles-Bement-Pond Co., New York.
Wickes Bros., Saginaw, Mich.
Williams & Wilson, Ltd., Montreal, Que.

PYROMETERS

Bristol Co., Waterbury, Conn.
Shore Instrument & Mfg. Co., New York.
Taylor Instrument Co., Rochester, N.Y.

QUARTERING MACHINES

Bertram & Sons, John, Dundas, Ont.
Niles-Bement-Pond Co., New York.

RAIL BENDERS

Algoma Steel Corp., Sault Ste. Marie, Ont.
Niles-Bement-Pond Co., New York.

RAILROAD TOOLS

Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machinery Co., Toronto.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Ltd., Montreal, Que.

RASPS

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Marshall, Son & Bunney, Toronto.
John Morrow Screw & Nut Co., Ingersoll.

RATCHETS

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Keystone Mfg. Co., Buffalo, N.Y.
Marshall, Son & Bunney, Toronto.

RAWHIDE PINIONS (See Gears)

REAMERS

Blancke Co., L. C., New York City.
Butterfield & Co., Inc., Rock Island, Que.

REAMERS, ADJUSTABLE

Blancke Co., L. C., New York City.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Greenfield Tap & Die Corp., Greenfield.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Plewes, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont.
The Kelly Reamer Co., Cleveland, O.
J. A. M. Taylor, 318 Stair Bldg., Toronto.
Wells Bros. of Can., Galt, Ont
Whitman & Barnes Co., St. Catharines.

REAMERS, BRIDGE, EXPANDING AND HIGH SPEED

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Aikenhead Hardware Co., Toronto.
Blancke Co., L. C., New York City.
W. Boker & Co., Inc., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Gisholt Machine Co., Madison, Wis.
Illinois Tool Works, Chicago, Ill.
Marshall, Son & Bunney, Toronto.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMERS, STEEL TAPER AND SELF-FEEDING

Butterfield & Co., Rock Island, Que.
Blancke Co., L. C., New York City.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Illinois Tool Works, Chicago, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMERS, CHUCKING

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que.
Blancke Co., L. C., New York City.
Greenfield Tap & Die Corp., Greenfield.
Marshall, Son & Bunney, Toronto.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Wells Bros. of Can., Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMERS, HAND

Blancke Co., L. C., New York City.
Butterfield & Co., Inc., Rock Island, Que.
Elliott & Whitehall, Galt, Ont.
Greenfield Tap & Die Corp., Greenfield.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Wells Bros. of Can., Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

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REAMERS, PIN
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Greenfield Tap & Die Corp., Greenfield.
Morrow Screw & Nut Co., John, Ingersoll.
Wells Bros. of Can., Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMER FLUTING MACHINES
Garvin Machine Co., New York.

REAMING MACHINES, PNEUMATIC
Independent Pneumatic Tool Co. of Can., Toronto
Garlock-Walker Machinery Co., Toronto.

RECORDING INSTRUMENTS
Bristol Co., Waterbury, Conn.
Gisholt Machine Co., Madison, Wis.
Taylor Instrument Co., Rochester, N.Y.

REELS, WIRE AND TEXTILE MFG.
American Pulley Co., Philadelphia, Pa.

REGULATORS, AUTOMATIC
Electric Steels & Metals, Ltd., Welland

REGULATORS, PRESSURE, TEMPERATURE
Can. Fairbanks-Morse Co., Montreal
Taylor Instrument Co., Rochester, N.Y.

REPAIR WORK, ALL KINDS
Elec. Steel & Metals, Welland, Ont.

RESPIRATORS
Strong, Kennard & Nutt Co., Cleveland

RIVETS.
Aikenhead Hardware Co., Toronto, Ont.
Parmenter & Bulloch Co., Gananoque
Rice, Lewis & Son, Toronto
Steel Co. of Canada, Ltd., Hamilton

RIVETERS, PNEUMATIC, HYDRAULIC, HAMMER, COMPRESSION
Can. Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Montreal
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago
Niles-Bement-Pond Co., New York.

RIVETING MACHINES, ELASTIC, ROTARY BLOW
Grant Mfg. & Machine Co., Bridgeport.
High-Speed Hammer Co., Rochester.
Williams & Wilson, Ltd., Montreal.
F. B. Shuster Co., New Haven, Conn.

ROAD BUILDING EQUIPMENT
Can. Ingersoll Rand Co., Ltd., Sherbrooke

RODS, HIGH SPEED AND CARBON DRILL
Blancke & Co., L. C., New York City.

RODS, ROPE AND SPRING
Page Steel & Wire Co., Adrian, Mich.

RODS, PURE NICKEL, MONEL METAL, NICHROME
Can. Driver-Harris Co., Ltd., Walkerville.

ROLL ENGRAVING
Hoggson & Pettis Mfg. Co., New Haven, Conn.

ROLLER CHAINS
Can. Link-Belt Co., Toronto.
Jones & Glassco, Montreal.

ROLLS, BENDING, STRAIGHTENING
John Bertram & Sons Co., Dundas.
Brown, Boggs Co., Ltd., Hamilton.
Can. Machinery Corp., Galt, Ont.
Dom. Steel Products Co., Ltd., Brantford
Garlock-Walker Machinery Co., Toronto.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo, O.
Williams & Wilson, Ltd., Montreal, Que.

ROLLS AND TABLES
Elec. Steel & Metals, Welland, Ont.

ROOFING
H. H. Robertson Co., Sarnia, Ont.

ROPE, GALV., MONEL METAL, BRONZE, TILLER AND SASH CORD
Can. Driver-Harris Co., Ltd., Walkerville

ROTARY SHEARS
The Quickwork Co., St. Mary's, Ohio

ROOF COOLERS
Electric Steels & Metals, Ltd., Welland.

ROLLING MACHINES, SHEET METAL
Manhattan Machine & Tool Co., Grand Rapids, Mich.

ROLLING MILL MACHINERY
Dom. Steel Products Co., Ltd., Brantford
Mesta Machine Co., Pittsburgh, Pa.

ROLL LATHES
Mesta Machine Co., Pittsburgh, Pa.

ROLLS, BENDING, STRAIGHTENING
Manhattan Machine & Tool Co., Grand Rapids, Mich.

ROLLS, CRUSHING
Can. Link-Belt Co., Toronto

ROLL ENGRAVINGS
Hoggson & Pettis Mfg. Co., New Haven Conn.

RUBBER MFRS.' SUPPIES
Hoggson & Pettis Mfg. Co., New Haven, Conn.

RUBBER MOULDS AND CORES
Elliott & Whitehall, Galt, Ont.

RUBBER MILL DRIVES
[illegible]
Can. Link-Belt Co., Toronto

RUBBER MILL MACHINERY
Bertrams, Ltd., Edinburgh, Scotland
[illegible]

RUBBING BRICKS
[illegible]

RULES
Brown & Sharpe Mfg. Co., Providence
James Chesterman & Co., Ltd., Sheffield
Rice, Lewis & Son, Toronto.
L. S. Starrett Co., Athol, Mass.

RULES, STEEL, STRAIGHT, AND FOLDING
Lufkin Rule Co. of Can., Windsor

RULES, BOXWOOD, FOLDING
Lufkin Rule Co. of Can., Windsor

RULES, BOARD AND LONG
Lufkin Rule Co. of Can., Windsor

RUST PREVENTATIVES
Oakley Chemical Co., New York, N.Y.

SAW MILL CONVEYORS
Can. Link-Belt Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

SAFETY DEVICES
Strong, Kennard & Nutt Co., Cleveland.

SAND MILLS
Frost Mfg. Co., Chicago, Ill.

SAND-BLAST EQUIPMENT

SAND BLAST SUPPLIES AND ACCESSORIES
Pangborn Corporation, Hagerstown, Md.

SAFETY APPLIANCES
Strong, Kennard & Nutt Co., Cleveland

SAFETY APPLIANCE GOGGLES
T. A. Willson Co., Inc., Reading, Pa.

SAND BLAST ABRASIVES
Pangborn Corporation, Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh.

SAND MIXING MACHINERY
Frost Mfg. Co., Chicago, Ill.

SANITARY DRINKING FOUNTAINS
Puro Sanitary Drinking Fountain Co., Haydenville.

SANDERS, DISC AND SPINDLE
Can. Sander Mfg. Co., Brockville, Ont.

SANDING MACHINES
Canada Machinery Corp., Galt.
Can. Sander Mfg. Co., Brockville, Ont.

SAW MILL MACHINERY
Can. Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt.
Robert Gardner & Son, Montreal.
Curtis Pneumatic Machy. Co., St. Louis.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

SASH SPRINGS
The Dunbar Brothers Co., Bristol, Conn.

SAWS, CIRCULAR METAL
Wm. Atkins & Co., Ltd., Sheffield, Eng.
Hunter Saw & Machine Co., Pittsburgh.
Marshal, Son & Bunney, Toronto.
Plewes Ltd., Winnipeg, Man.
Simonds Mfg. Co., Fitchburgh, Mass.
Tabor Mfg. Co., Philadelphia, Pa.

SAWS, HACK (See Hack Saws)

SAW SHARPENERS
Greenfield Tap & Die Corp., Greenfield.
Hunter Saw & Machine Co., Pittsburgh.
Wells Bros. of Can., Galt, Ont.

SAWS, SLITTING
J. A. M. Taylor, Stair Bldg., Toronto.

SCALES, MECHANICS'
Lufkin Rule Co. of Can., Windsor.

SCLEROSCOPES
Shore Instrument & Mfg. Co., New York

SCREENING MACHINERY
Can. Link-Belt Co., Toronto.

SCREW DRIVERS
Whitman & Barnes Co., St. Catharines.

SCREW EXTRACTORS
Cleveland Twist Drill Co., Cleveland

SCREW MACHINES, HAND, AUTOMATIC
Brown & Sharpe Mfg. Co., Providence.
Can. Fairbanks-Morse Co., Montreal.
Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machy. Co., Ltd., Toronto
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield
A. B. Jardine & Co., Hespeler.
National Acme Co., Cleveland, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. of Can., Galt, Ont.
Warner & Swasey Co., Cleveland, O.
A. R. Williams Machy. Co., Toronto
Wood Turret Mach. Co., Brazil, Ind.
Williams & Wilson, Ltd., Montreal, Que.

SCREWS, MACHINE, SET, CAP AND SPECIAL
Galt Machine Screw Co., Galt.
John Morrow Screw & Nut Co., Ingersoll
National Acme Co., Montreal.
Rice, Lewis & Son, Toronto.
Steel Co. of Canada, Ltd., Hamilton.
Wilkinson & Kompass, Hamilton.

SCREW COLLARS
Galt Machine Screw Co., Ltd., Galt, Ont.
John Morrow Screw & Nut Co., Ingersoll.

SCREW MACHINES, PLAIN WIRE FEED
Brown & Sharpe Mfg. Co., Providence, R.I.

SCREW PLATES
Butterfield & Co., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield.
A. B. Jardine & Co., Hespeler.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Rice, Lewis & Son, Toronto.
J. A. M. Taylor, Stair Bldg., Toronto
Wells Bros. of Can., Galt.
Wilkinson & Kompass, Hamilton.

SCREWS, SAFETY SET
Galt Machine Screw Co., Ltd., Galt, Ont.

SCREW SLOTTERS
Butterfield & Co., Inc., Rock Island, Que.
Garvin Machine Co., New York.
National Acme Co., Cleveland, O.
Pratt & Whitney Co., Dundas, Ont.

SEPARATATORS, MOISTENERS AND OIL FOR COMPRESSED AIR
Pangborn Corporation, Hagerstown, Md.

SELF-OPENING DIES
See Dies.

SEPARATORS, SAND
Pangborn Corporation, Hagerstown, Md.

SET SCREWS, SAFETY
Aikenhead Hardware Co., Toronto.
Bristol Co., Waterbury, Conn.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Wilkinson & Kompass, Hamilton.

SHANKS, STRAIGHT AND TAPER
Jacobs Mfg. Co., Hartford, Conn.

SHAPERS
John Bertram & Sons Co., Dundas.
Can. Fairbanks-Morse Co., Montreal.
Canadian Machinery Corp., Galt.
Geo. F. Foss Mchy. & Sply. Co., Montreal
Robt. Gardner & Son, Montreal.
Garlock-Walker Mach'y. Co., Toronto.
Hendey Machine Co., Torrington, Conn.
Hamilton Mach. Tool Co., Hamilton.
Milwaukee Shaper Co., Milwaukee, Wis.
Rice Mach. Tool Co., Hamilton
Williams & Wilson, Ltd., Montreal.

SHAPERS, GEAR
Fellows Gear & Shaper Co., Springfield, V.
[illegible], Toronto.

SHAFTING
Algoma Steel Corp., Sault Ste. Marie, O.
Can. Fairbanks-Morse Co., Montreal
Dom. Steel Products Co., Ltd., Brantford
Garlock-Walker Machy. Co., Ltd., Toronto
Jones & Glassco, Montreal.
Niles-Bement-Pond Co., New York.
Can. Drawn Steel Co., Hamilton.
Pratt & Whitney Co., Dundas.
Rice, Lewis & Son, Toronto
A. R. Williams Machy. Co., Toronto.
Wilkinson & Kompass, Hamilton, Ont.
Wilson & Co., J. C., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que.

SHARPENING STONES
Norton Co., Worcester, Mass.
Rice, Lewis & Son, Toronto.

SHEARING MACHINES, ANGLE IRON, BAR AND GATE
John Bertram & Sons Co., Dundas.
Bertrams Ltd., Edinburgh, Scotland.
Canada Machinery Corp., Galt, Ont.
Dom. Steel Products Co., Ltd., Brantford
Garlock-Walker Machy. Co., Ltd., Toronto
A. B. Jardine & Co., Hespeler, Ont.
Niles-Bement Pond Co., New York.
Toledo Machine & Tool Co., Toledo, O.

SHEARS, POWER
John Bertram & Sons Co., Dundas.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton.
Can. Blower & Forge Co., Kitchener.
Canada Machinery Corp., Galt, Ont.
Dom. Steel Products Co., Ltd., Brantford
Garlock-Walker Machy. Co., Ltd., Toronto
Long & Allstatter, Hamilton, Ohio.
Wickes Bros., Saginaw, Mich.
A. B. Jardine & Co., Hespeler, Ont.
National Machy. Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York.
H. D. Stoll Co., Inc., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo, O.
Williams & Wilson, Ltd., Montreal, Que.

SHEARS, ROTARY
Marshalltown Mfg. Co., Marshalltown, Ia.
The Quickwork Co., St. Mary's, Ohio.

SHEARS, PNEUMATIC
Toledo Machine & Tool Co., Toledo, Ohio.

SHEET METAL ROLLING MACHINES
Peck, Stow & Wilcox Co., Southington.

SHEETS, NICKEL, RESIST. ALLOY
Can. Driver-Harris Co., Ltd., Walkerville.

SHEARS, PLATE CUTTING, SLITTING
Dom. Steel Products Co., Ltd., Brantford
Marshalltown Mfg. Co., Marshalltown, Ia.
Quickwork Co., St. Mary's, Ohio.

SHEARS, SPLITTING
Dom. Steel Products Co., Ltd., Brantford
Marshalltown Mfg. Co., Marshalltown, Ia.
Peck, Stow & Wilcox Co., Southington.

SHEARS, IRREGULAR AND CIRCLE CUTTING
The Quickwork Co., St. Mary's, Ohio.
D. H. Stoll Co., Inc., Buffalo, N.Y.

SHEET METAL MACHINERY
Peck, Stow & Wilcox Co., Southington, C.

SHEARS, SERPENTINE
The Quickwork Co., St. Mary's, Ohio.

SHEARS, SQUARING
Brown, Boggs & Co., Hamilton, Ont.
D. H. Stoll Co., Inc., Buffalo, N.Y.

SHEET METAL WORKING TOOLS
Baird Machine Co., Bridgeport, Conn.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton.
Peck, Stow & Wilcox Co., Southington, C.
D. H. Stoll Co., Inc., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal

SHEETS, CRUCIBLE, CAST
Kayser-Ellison & Co., Ltd., Montreal.
Ralph B. Norton, Agent, Montreal

SHEET METAL WORKING MACHINERY
D. H. Stoll Co., Inc., Buffalo, N.Y.

SHELVING, STEEL
Dennis Wire & Iron Works, London

SHIPYARD MACHINERY, SHOP FURNITURE
Dennis Wire & Iron Works, London.

SIDE TOOLS
Armstrong Bros. Tool Co., Chicago.
J. H. Williams & Co., Brooklyn, N.Y.

SILENT CHAINS
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.

SLEDGES
Aikenhead Hardware Co., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Wilkinson & Kompass, Hamilton, Ont.

SLEDGES, CAST IRON
Katie Foundry, Galt, Ont.

SLINGS, CHAINS
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

SLOTTERS
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
National-Acme Co., Cleveland, Ohio.
Niles-Bement-Pond Co., New York.

SMOKESTACKS
William Hamilton Co., Peterboro, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

SNIPS, TINNERS AND SHEET METAL WORKERS
Kearney & Trecker Co., Milwaukee, Wis.
J. Morrow Screw & Nut Co., Ingersoll, Ont.

SOCKETS
Brown & Sharpe Mfg. Co., Providence.
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Keystone Mfg. Co., Buffalo, N.Y.
Modern Tool Co., Erie, Pa.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

SOIL PIPE FITTINGS, CAST IRON
Katie Foundry, Galt, Ont.

SOLDERING IRONS
Aikenhead Hardware Co., Toronto, Ont.
Brown, Boggs & Co., Hamilton, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.

SOLDER
Aikenhead Hardware Co., Toronto, Ont.
Canada Metal Co., Ltd., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.

SPEED REDUCING GEARS
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.

SLICING CLAMPS
Peck, Stow & Wilcox Co., Southington, Conn.

SPRINGS, MACHINERY
Barnes, Wallace Co., Bristol, Conn.
Can. Steel Foundries, Ltd., Montreal.
Cleveland Wire Spring Co., Cleveland.
Dunbar Bros. Co., Bristol, Conn.
Garlock-Walker Machinery Co., Toronto.
Jas. Steele, Ltd., Guelph, Ont.

SPECIAL MACHINERY
Baird Machine Co., Bridgeport, Conn.
Bertram, John, & Sons Co., Dundas.
Bliss, E. W. Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada.
Brown Engineering Corp., Toronto, Ont.
Dom. Steel Products Co., Ltd., Brantford.
Ford-Smith Machine Co., Hamilton, Ont.
Garlock-Walker Machinery Co., Toronto.
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Garvin Machine Co., New York.
Globe Engineering Co., Ltd., Hamilton.
Gooley & Edlund, Inc., Courtland, N.Y.
John H. Hall & Sons, Brantford.
A. B. Jardine & Co., Hespeler, Ont.
Katie Foundry, Galt, Ont.
National-Acme Co., Cleveland, Ohio.
Mesta Machine Co., Pittsburgh, Pa.
Marten Machine Co., Hamilton, Ont.
Rice Mach. Tool Co., Ramilton.
Stoll Co., D. H., Buffalo, N.Y.
Victoria Foundry Co., Ottawa, Ont.
Wilson & Co., J. C., Belleville, Ont.
William R. Perrin, Ltd., Toronto.
Warmington & Co., J. N., Montreal, P.Q.

SPECIAL TOOLS, MACHINERY
Globe Engineering Co., Ltd., Hamilton.
Hoggson & Pettis Mfg. Co., New Haven, Conn.
Wilton & Mfg. Co., Boston, Mass.

SPRING COILING AND WINDING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Garvin Machine Co., New York.

SPRING MAKING MACHINERY (AUTOMATIC)
Baird Machine Co., Bridgeport, Conn.

SPRINGS, SPIRAL, TOOL
The Dunbar Bros. Co., Bristol, Conn.

SPROCKETS, COMPENSATING
Morse Chain Co., Ithaca, New York.

SPROCKETS, SPRING
Morse Chain Co., Ithaca, New York.

SPROCKETS, CHAIN
Can. Link-Belt Co., Toronto, Ont.
Grant Gear Works, Boston, Mass.
Jones & Glassco, Montreal.
Morse Chain Co., Ithaca, N.Y.
Philadelphia Gear Works, Philadelphia.
Wilson & Co., J. C., Belleville, Ont.

SPRINGS FOR TOYS AND ELECTRIC DEVICES
The Dunbar Bros. Co., Bristol, Conn.

SPROCKET WHEELS, CAST
Can. Link Belt Co., Toronto, Ont.

If interested tear out this page and place with letters to be answered.

Montreal.
Vanadium-Alloys Steel Co., Pittsburgh.

STEEL, CHROME, MANGANESE
Electric Steel Co., Montreal, Que.

STEEL, OPEN HEARTH
Simonds Steel Co., Lockport, New York.

STEEL, CRUSHED
Pittsburgh Crushed Steel Co., Pittsburgh.

STEEL PRODUCTS AND MACHINERY
Can. Steel Foundries, Ltd., Montreal.

STEEL, ROCK DRILL
Armstrong, Whitworth of Canada, Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

STEEL, STRUCTURAL
Algoma Steel Corp., Sault Ste. Marie.
MacKinnon Steel Co., Sherbrooke, Que.

STEEL, TOOL
Armstrong, Whitworth of Can., Montreal.
Atkins & Co., Wm., Sheffield, Eng.
Billmeier Co., L. C., New York City.
Boker & Co., Inc., H., Montreal, Que.
Can. Fairbanks-Morse Co., Montreal.
Drury Co. H. A., Montreal, Que.
Firth & Sons, Thos., Montreal, Que.
Hawkridge Bros. Co., Boston, Mass.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto, Ont.
Norton, Ralph B., Agent, Montreal.
Latrobe Electric Steel Co., Latrobe, Pa.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son Toronto, Ont.
Vanadium-Alloys Steel Co., Pittsburgh.
Wells Bros. of Can., Galt, Ont.

STENCILS
Hoggson & Pettis Mfg. Co., New Haven, Conn.

STOCK RACKS FOR BARS, PIPING, ETC.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

STOCKS AND DIES
Butterfield & Co. Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros., of Can., Galt, Ont.

STOCKS, PIPE
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.
Wells Bros., Co., of Canada, Galt, Ont.

STRAIGHTENING MACHINERY
Baird Machinery Co., Bridgeport, Conn.
Bertrams, Ltd., Edinburgh, Scotland.

STRAND
Dom. Steel Products Co., Ltd., Brantford
Page Steel & Wire Co., Adrian, Mich.

SURFACE PLATES
Brown & Sharpe Mfg. Co., Providence, R.I.

STRUCTRAL STEEL WORKS
William Hamilton Co., Peterboro, Ont.

SUPPLIES, RUBBER MFRS.
Hoggson & Pettis Mfg. Co., New Haven, Conn.

SWEDGES AND WEDGES
Whitman & Barnes Co., St. Catharines.

SWITCHBOARDS
Can. General Electric Co., Toronto, Ont.

SWITCHES, RAILWAY
Can. Steel Foundries, Ltd., Montreal.

TABLES, SAND-BLAST
Panghorn Corporation, Hagerstown, Md.

TAPPING MACHINES (PNEUMATIC)
Cleveland Pneumatic Tool Co., Toronto.

TANKS, GASOLINE, KEROSENE AND OIL
Bowser Co., Ltd., S. F., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Dom. Forge & Stamping Co., Walkerville.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Marshall, Son & Bunney, Toronto.

TANKS, LUBRIATING, OIL STORAGE
Bowser Co., Ltd., S. F., Toronto, Ont.

TANKS, RUBBER CEMENT
Bowser Co., Ltd., S. F., Toronto, Ont.

TANKS, STEEL, WATER PRESSURE
Bowser Co., Ltd., S. F., Toronto, Ont.
Dominion Bridge Co., Montreal, Quebec.
MacGowern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Toronto Iron Works, Ltd. Toronto.

TANK WAGONS
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal.
Toronto Iron Works, Ltd., Toronto.

TANKS
Can. Ingersoll-Rand Co., Ltd., Sherbrooke
Elec. Steel & Metals, Welland, Ont.
Gen. Wire Co., Ltd., Toronto.
MacKinnon Steel Co., Sherbrooke, Que.
William Hamilton Co., Peterboro, Ont.

TAPER PINS
Gal' Machine Screw Co., Ltd., Galt, Ont.

TAPES, MEASURING
James Chesterman & Co., Ltd., Sheffield, Eng.
Rice Lewis & Son, Toronto, Ont.

TAPPING MACHINES AND ATTACHMENTS
Bertram, John & Sons Co., Dundas.
Bicknell-Thomas Co., Greenfield, Mass.
Rudel-Belnap Mach. Co., Ltd., Montreal.
Canada Machinery Corp., Galt, Ont.
Geometric Tool Co., New York.
The Geometric Tool Co., New Haven.
J. H. Hall & Sons, Brantford, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murphy Machine & Tool Co., Detroit.
Niles-Bement-Pond Co., New York.
Rickert-Shafer Co., Erie, Pa.
National-Acme Co., Cleveland, Ohio.
L. S. Starrett Co., Athol, Mass.
Whitney Mfg. Co., Hartford, Conn.
Williams & Wilson, Limited, Montreal.

TAPES, MEASURING, STEEL AND WOVEN
Lufkin Rule Co. of Can., Windsor, Ont.

TAPES, POCKET
Lufkin Rule Co. of Can., Windsor, Ont.

TAPS, ADJUSTABLE
Boker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Geometric Tool Co., New Haven.
Modern Tool Co., Erie, Pa.
Murphy Machine & Tool Co., Detroit.
Pilot Steel & Tool Co., Montreal, Que.
Victor Tool Co., Waynesboro, Pa.

TAPS, GUN, HAND, BOILER
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

TAPS, MACHINE RELIEVED
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

TAPS, MACHINE SCREW
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

TAPS, PIPE
Butterfield & Co., Inc., Rock Island, Que.
Atkins & Co., Ltd., Wm. Sheffield, Eng.
Greenfield Tap & Die Corp., Greenfield.
Marshall, Son & Bunney, Toronto.
Wells Bros. of Can., Galt, Ont.

TAPS, SPECIAL
Elliott & Whitehall, Galt, Ont.

TAPS, STAYBOLT, TAPPER
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.

TAPS, DIES AND WRENCHES
Butterfield & Co., Rock Island, Que.
Blancke Co., L. C., New York City.
Can Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Pratt & Mchy. & Spl. Co., Q. Montreal.
Geometric Tool Co., New Haven.
Greenfield Tap & Die Corp., Greenfield.
Jardine & Co., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Morse Twist Drill & Mchy. Co., New Bedford, Mass.
Murchey Machine & Tool Co., Detroit.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Starrett Co., L. S., Athol, Mass.
Taylor, J. A. M., 318 Stair Bldg., Toronto.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

TAP EXTRACTORS
Walton Co., The, Hartford, Conn.

THERMOMETERS, INDUSTRIAL ENGRAVED TEMPERATURE AND PRESSURE
Taylor Instrument Co., Rochester, N.Y.

THERMOMETERS, RECORDING AND INDEX
Bristol Co., Waterbury, Conn., U.S.A.
Taylor Instrument Co., Rochester, N.Y.

TESTING INSTRUMENTS, METALLURGICAL
Shore Instrument & Mfg. Co., New York.

TENOVERS
Oliver Machy. Co., Grand Rapids, Mich.

TESTING LABORATORIES
Toronto Testing Laboratory, Toronto.

THREAD-CUTTING MACHINES
Can. Fairbanks-Morse Co., Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Garlock-Walker Mach. Co., Ltd., Toronto.
Geometric Tool Co., New Haven.
Jardine & Co., Ltd., A. B., Hespeler.
Landis Machine Co., Waynesboro, Pa.
National-Acme Co., Cleveland, Ohio.
National Machy. Co., Tiffin, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co of Canada, Galt., Ont.
Williams & Wilson, Ltd., Montreal Que.

THREAD GAUGES
Wilton Mfg. Co., Boston, Mass.

THREADING TOOLS
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield.
Landis Machine Co., Waynesboro, Pa.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. of Canada, Galt, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

THREADING MACHINES FOR BOLTS, NUTS AND PIPES
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. Co. of Canada, Galt., Ont.
Williams & Wilson, Ltd., Montreal, Que.

THREAD MILLING MACHINES
Taft-Pierce Mfg. Co., New York, N.Y.
Gray Ball Bearing Co., Ltd., Toronto.
Smalley-General Co., Bay City, Mich.

THUMB SCREWS AND NUTS
See Screws.

TIGHTENERS, BELT
Hoggson & Pettis Mfg. Co., New Haven, Conn.

TINSMITHS' TOOLS
Brown, Boggs & Co., Hamilton, Can.
Williams & Wilson, Ltd., Montreal, Que.

TIRE BENDERS
Jardine & Co., Ltd., A. B., Hespeler.

TIRE SETTING MACHINES, HYDRAULIC
Perrin, Ltd., William R., Toronto.
West Tire Setter Co., Rochester, N.Y.

TOOL CASES
Rice Lewis & Son, Toronto, Ont.

TOOL HOLDERS
Aikenhead Hardware Co., Toronto, Ont.
Cleveland Twist Drill Co., Cleveland.
Armstrong Bros. Tool Co., Chicago.
Gisholt Machine Co., Madison, Wis.
Modern Tool Co., Erie, Pa.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

TOOL POSTS, LATHE
Armstrong Bros. Tool Co., Chicago.
Williams & Co., J. H., Brooklyn, N.Y.

TOOL ROOM PARTITIONS
Canada Wire & Iron Goods Co., Hamilton.

TOOLS, BENDING
Peck, Stow & Wilcox Co., Southington.

TOOLS, BLACKSMITHS'
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son Toronto, Ont.

TOOLS, ADJUSTABLE BORING
Kelly Reamer Co., Cleveland, O.
Williams & Wilson, Ltd., Montreal, Que.

TOOLS, ELECTRIC
Independent Pneumatic Tool Co., Chicago.
Williams Machy. Co., A. B., Toronto.
Ford-Smith Machine Co., Hamilton, Ont.
U. S. Electrical Tool Co., Cincinnati, O.

TOOLS, FORMING
Davidson Tool Mfg. Co., New York, N.Y.

TOOLS, LATHE, PLANER, SLOTTER
Armstrong Bros. Tool Co., Chicago.
Gisholt Machine Co., Madison, Wis.
Williams & Co., J. H., Brookiyn, N.Y.

TOOLS, SCREW MACHINE
Foster Machine Tool Co., Elkhart, Ind.

TOOLS, SPECIAL
Globe Engineering Co., Ltd., Hamilton.
Hoggson & Pettis Mfg. Co., New Haven, Conn.

TORCHES, BLOW
Int. Mach. & Supply Co., Ltd., Montreal.

TORCHES, STEEL
Armstrong, Whitworth of Can., Montreal.
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

TORCHES, GASOLINE, KEROSENE AND ALCOHOL
Turner Brass Works, Sycamore, Ill.

TRACK SYSTEMS
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.

TRADE MARKS
Shipman & Co., H. C., Ottawa.

TRANSFORMERS
Can. General Electric Co., Toronto, Ont
MacGovern & Co., Montreal, Que.

TRANSITS
Hughes, Owens Co., Ltd., Montreal, Que.

TRANSMISSION CHAIN
Morris Chain Co., Ithaca, New York.

TRANSMISSION MACHINERY
American Pulley Co., Philadelphia, Pa.
Can. Link-Belt Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Can. Drawn Steel Co., Hamilton, Ont.
Coventry Chain Co., Coventry, England.
Hamilton Gear & Machine Co., Toronto.
Jones & Glassco, Montreal.
Kennedy & Sons, Wm., Owen Sound, Ont.
Morse Chain Co., Ithaca, N.Y.
Wilson & Co., J. C., Belleville, Ont.
Williams Machinery Co., A. B., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

TRANSMISSION ROPE
Jones & Glassco, Montreal, Que.
MacKinnon Steel Co., Ltd., Sherbrooke.
Wilson & Co., J. C., Belleville, Ont.

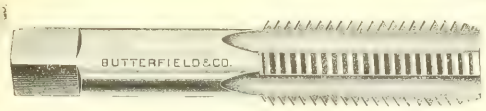
TRANSMISSION TOWERS
Curtis Pneumatic Machy. Co., St. Louis.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Northern Crane Works, Walkerville.
Tallman Brass & Metal Co., Hamilton.

TROLLEYS
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

TRUCKS, FACTORY, FREIGHT, ETC
Canada Machinery Corp., Galt, Ont.
Chapman Double Ball Bearing, Toronto.
MacKinnon Steel Co., Sherbrooke, Que.
Rice Lewis & Son, Toronto, Ont.

TRUCKS, FLOOR
Beatty Bros., Fergus, Ont.

BUTTERFIELD



Drills, Taps, Dies Reamers

and Milling Cutters

Quality in small tools means satisfaction to the skilled mechanic who uses them, his loyal co-operation to achieve the finest results.

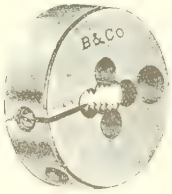
Prolonged service under the most severe conditions have proven the quality of Butterfield Tools.

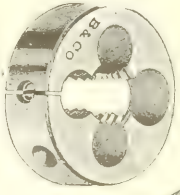
Butterfield quality is uniformly dependable

May we send you the proof — (a trial order)?

Butterfield & Co., Inc.

Rock Island, Quebec





If interested tear out this page and place with letters to be answered.

Canadian Machinery As An Advertising Medium

By J. H. M.

THERE is a saying that no matter where we go we will meet with a doubting Thomas, and, of course, the same holds good as far as advertising is concerned.

"You've got to show me," is a favorite expression of these Missouri inhabitants, so following is proof of the most convincing character. To commence with, the writer is not connected with the advertising staff, but merely one of the editorial department. He was not in search of a glowing tale regarding the possibilities of advertising, but he was out to find how business in general was going.

The gentleman whom he interviewed was S. L. Clark, Esq., of the Perfect Machine Tool Company, Galt, Ontario.

"How's business?" was my first question, and the reply was as follows: "Splendid. We are doubling our foundry capacity and intend doubling our machine shop space directly after."

Naturally, such a reply was encouraging.

"How do you account for this rush and where is the work coming from"? was my next query.

"To your first question I would say that this is the result of producing a first-class article and advertising the same judiciously and wisely; secondly, that our orders are coming in from all over the Dominion of Canada and Great Britain," was his reply.

"Evidently you are a firm believer in advertising," I said.

"I certainly am," was the reply. "Here are my views on the subject:

"In advertising, just the same as in anything else, good judgment must be used. You must study where to advertise, when to advertise and how to advertise. Each feature is equally important. You can spend more money foolishly through advertising than in any other way. In some cases I would not give five cents for space which they ask $10.00, $20.00 or $30.00 for, simply because I believe that no results would be obtained. In other words, I pick carefully where I advertise. I am a firm believer in the possibilities of export business and have secured inquiries from England, France, Spain and South America through judicious advertising in CANADIAN MACHINERY. We have made good connections already in England and hope soon to make connections of like nature in the other countries mentioned. The man who advertises is bound to go ahead, providing that the article he is advertising backs up every statement in his advertisement and he uses judgment in what he puts before the buying public.

"Personally, I cannot speak too strongly for the cause of advertising, and I firmly believe that CANADIAN MACHINERY, as an advertising medium, has helped us considerably in our present business expansion."

TRUCKS, LUMBER AND KILN
Swedish Steel & Importing Co., Montreal.
Northern Crane Works, Walkerville.
TUBING, SEAMLESS, BRASS AND COPPER
Standard Tube & Fence Co., Woodstock.
Tallman Brass & Metal Co., Hamilton.
TUBING COILERS, FLEXIBLE METAL
Almond Mfg. Co., Ashburnham, Mass.
TURRET MACHINES, LATHES
Brown & Sharpe Mfg. Co., Providence.
Garlock-Walker Machinery Co., Toronto.
Greenfield Tap & Die Corp., Greenfield.
Oliver Machy. Co., Grand Rapids, Mich.
Pratt & Whitney, Hartford, Conn.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.
TURBINES, HORIZONTAL
Wilson & Co., J. C., Belleville, Ont.
TURBO GENERATOR UNITS
MacGovern & Co., Montreal, Que.
Warner & Swasey, Cleveland, O.
Garvin Machine Co., New York.
TURNBUCKLES
Canada Fdrs. & Forg. Ltd., Welland.
Morrow Screw & Nut Co., Ingersoll, Ont.
Rice Lewis & Son, Toronto, Ont.
TURNTABLES
Can. Link-Belt Co., Toronto, Ont.
Elec. Steel & Metals, Welland, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.
TWIST DRILLS
Butterfield & Co., Inc., Rock Island, Que.
Blancke Co., L. C., New York City.
UPSETTING AND BENDING MACHINERY
Bertram & Sons Co., John, Dundas.
Brown, Boggs Co., Ltd., Hamilton, Can.
Ford-Smith Machine Co., Hamilton, Ont.
Garlock-Walker Machinery, Toronto.
Jardine & Co., A. B., Hespeler, Ont.
National Machy. Co., Tiffin, O.
Canada Machinery Corp., Galt, Ont.
Niles-Bement-Pond Co., New York.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.
VALVES, REDUCING
Geo. W. Cole, Ltd., Toronto.
VALVES, CHECK
Geo. W. Cole, Ltd., Toronto.
VALVE LEATHERS
Graton & Knight Mfg. Co., Montreal.
VALVE GRINDERS (PNEUMATIC)
Cleveland Pneumatic Tool Co., Toronto.
VALVES, HYDRAULIC
Metalwood Mfg. Co., Detroit, Mich.
VENTILATING APPARATUS
Brantford Oven & Rack Co., Brantford.
Can. Blower & Forge Co., Kitchener, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.
VENTILATORS
H. H. Robertson, Ltd., Sarnia, Ont.

VISE STANDS, PORTABLE
Williams & Co., J. H., Brooklyn, N.Y.
VISES, BENCH
Aikenhead Hardware Co., Toronto, Ont.
Becker Milling Machine Co., Boston, Mass.
Foss Machy. & Sply. Co., G. F., Montreal.
Williams & Wilson, Ltd., Montreal, Que.
VISES, DRILL
Hoggson & Pettis Mfg. Co., New Haven, Conn.
VISES, PIPE
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Rock Island, Que.
Marshall, Son & Bunney, Toronto.
Wells Bros. Co. of Canada, Galt, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.
VISES, MILLING MACHINE
Brown & Sharpe Mfg. Co., Providence, R.I.
VISES, PLANER AND SHAPER
Aikenhead Hardware Co., Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
Williams & Wilson, Ltd., Montreal, Que.
WASHER MACHINES
National Machy. Co., Tiffin, Ohio.
WASHERS
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Barnes, Wallace, Co., Bristol, Conn.
Graton & Knight Mfg. Co., Worcester.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Norton, Ralph B., Agent, Montreal.
London Bolt & Hinge Wks., London, Ont.
Steel Co. of Canada, Ltd., Hamilton, Ont.
WASTE
Wilkinson & Kompass Hamilton, Ont.
Wood Turret Machine Co., Brazil, Ind.
WASTE CLEANER AND OIL RECLAIMER
Oakley Chemical Co., New York, N.Y.
WATER-INTAKE SCREENS
Can. Link-Belt Co., Toronto, Ont.
WATER TOWERS
Toronto Iron Works, Ltd., Toronto.
WELDERS, ELECTRIC, SPOT AND BUTT
Knight Metal Products, Toronto.
WELDING, WIRE
Page Steel & Wire Co., Adrian, Mich.
WELDING, ELECTRIC, SPOT, BUTT, ETC.
St. Lawrence Welding Co., Montreal.
Welding & Supplies Co., Montreal, Que.
Tabor Mfg. Co., Philadelphia, Pa.
WELDING MASKS
Davis-Bournonville Co., Toronto, Ont.
Strong, Kennard & Nutt Co., Cleveland.
WELDING GOGGLES
Davis-Bournonville Co., Toronto, Ont.
Strong, Kennard & Nutt Co., Cleveland.
WELDING RODS AND WIRE
Davis-Bournonville Co., Toronto, Ont.
Page Steel & Wire Co., Adrian, Mich.
Welding & Supplies Co., Montreal, Que.

WELDING SUPPLIES
Davis-Bournonville Co., Toronto, Ont.
Union Carbide Co., Toronto, Ont.
Nat. Electro Products Ltd., Toronto, Ont.
WELDLESS BOILER TUBES
Furniss, Clarke & Co., Montreal, Que.
WHEELS, CAR, STEEL
Elec. Steel & Metals, Welland, Ont.
WHEELS, SPROCKET AND TRACTION
Can. Link-Belt Co., Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que.
WHEELS, TURBINE, WATER
Elec. Steel & Metals, Welland, Ont.
WHEELS, PRESSED STEEL
American Pulley Co., Philadelphia, Pa.
WHEEL TRUEING TOOLS
Wheel Trueing Tool Co., Windsor, Ont.
Williams & Wilson, Ltd., Montreal, Que.
WINCHES
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Hall & Sons, John H., Brantford.
Kennedy & Son, Wm., Owen Sound, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
WIRE, CAST STEEL AND MUSIC
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
WIRE COILING AND POINTING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Shuster Co., F. B., New Haven, Conn.
WIRING MACHINES
Quickworth Co., St. Marys, Ohio.
WRENCHES, PIPE, POWER
Peck, Stow & Wilcox Co., Southington.
WIRE CLOTH AND PERFORATED METALS
Canada Wire & Iron Goods, Hamilton.
Page Steel & Wire Co., New York, N.Y.
WIRE FENCING
WIRE, COPPER, CLAD STEEL
WIRE, LINK FABRIC
Page Steel & Wire Co., Adrian, Mich.
WIRE FORMING AND STAMPING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Brown, Boggs Co., Ltd., Hamilton, Can.
Shuster Co., F. B., New Haven, Conn.
WIRE NAILS
Page Steel & Wire Co., New York, N.Y.
Parmenter & Bulloch Co., Gananoque.
Steel Co. of Canada, Ltd., Hamilton, Ont.
WIRE NAIL MACHINERY
National Machy. Co., Tiffin, Ohio.
Page Steel & Wire Co., New York, N.Y.
WIRE, SPARK PLUG, MANGANESE NICKEL, COPPER NICKEL, MONEL METAL
Can. Driver-Harris Co., Ltd., Walkerville.
WIRE SPRING
Page Steel & Wire Co., Adrian, Mich.
WIRE STEEL, BRASS, COPPER
Page Steel & Wire Co., New York.
Steel Co. of Canada, Ltd., Hamilton, On.
WIRE, TELEPHONE, TELEGRAPH, GALVANIZED AND ELECTRICAL
Page Steel & Wire Co., Adrian, Mich.
WIRE, WEAVING, MONEL METAL, BRASS, COPPER, GOLDEN BRONZE, HIGH BRASS, LOW BRASS, NICKEL
Can. Driver-Harris Co., Ltd., Walkerville.
WOOD BORING MACHINES
Canada Machinery Corp., Galt, Ont.
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Ltd, Montreal, Que.
WIRE STRAIGHTENERS AND CUTTERS
Baird Machine Co., Bridgeport, Conn.
Brown, Boggs Co., Ltd., Hamilton, Can.
Shuster Co., F. B., New Haven, Conn.
WOODWORKING MACHINERY
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Machinery Co., Toronto.
Oliver Machy. Co., Grand Rapids, Mich.
Silver Mfg. Co., Salem, Ohio.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.
WOOD TRIMMERS AND LATHES
Oliver Machy. Co., Grand Rapids, Mich.
WOOD MILLING MACHINES AND SHAPERS
Oliver Machy. Co., Grand Rapids, Mich.
WRENCHES
Williams & Co., J. H., Brooklyn, N.Y.
Armstrong Bros. Tool Co., Chicago, Ill.
Butterfield & Co., Rock Island, Que.
Canada Fdrs. & Forg., Ltd., Welland.
Keystone Mfg. Co., Buffalo, N.Y.
Wells Bros. of Canada, Galt, Ont.
Whitman & Barnes Co., St. Catharines.
Whitman & Barnes Mfg. Co., Akron, O.
WOVEN STEEL PARTITIONS
Page Steel & Wire Co., Adrian, Mich.
WRENCHES, AUTOMOBILE, NARROW JAW, MONKEY, SCREW
Morrow Screw & Nut Co., Ingersoll, Ont.
Whitman & Barnes Co., St. Catharines.
WRENCHES, PIPE, MONKEY, TAP AND POWER
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Aikenhead Hardware Co., Toronto, Ont.
Marshall, Son & Bunney, Toronto.
Peck, Stow & Wilcox Co., Southington.
Rice Lewis & Son, Toronto, Ont.
Wells Bros. of Canada, Galt, Ont.
Whitman & Barnes Co., St. Catharines.
Williams & Co., J. H., Brooklyn, N.Y.
Keystone Mfg. Co., Buffalo, N.Y.
Whitman & Barnes Mfg. Co., Akron, O.
Williams & Wilson, Ltd., Montreal, Que.
WRENCHES, SOCKET
Williams Machy. Co., A. R., Toronto.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

INDEX TO ADVERTISERS

C.M.C.

GAP LATHES

FOR

SHIPMENT FROM STOCK

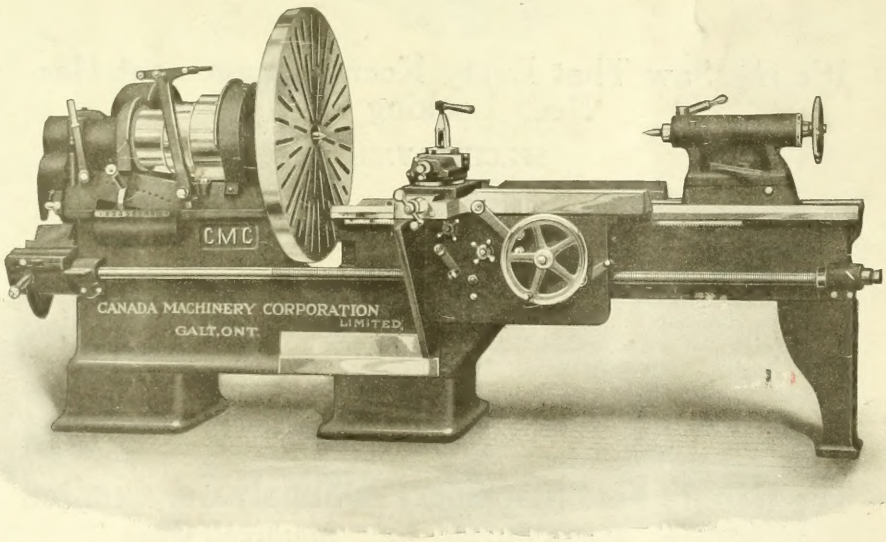
We offer subject to prior sale

20" x 38" x 12' Gap Lathes with quick change gears.
20" x 38" x 14' Gap Lathes with quick change gears.
18" x 32" x 12' Gap Lathes with plain change gears.
20" x 38" x 10' Gap Lathes with plain change gears.
20" x 38" x 12' Gap Lathes with plain change gears.
20" x 38" x 14' Gap Lathes with plain change gears.

CANADA MACHINERY CORPORATION
LIMITED

GALT - - ONTARIO

Toronto Office and Warerooms, Brock Avenue Subway



20" Gap Lathe With Quick Change Gears